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PRESENTED
21 FEB 1949

PROCEEDINGS

OF THE

Bournemouth Natural Science Society

VOL. XXXVIII

SESSION 1947-48

Price - Two Shillings and Sixpence

PROCEEDINGS of the

Bournemouth Natural Science Society

VOL. XXXVIII.
SESSION 1947-48

PUBLISHED BY THE SOCIETY AT ITS HOUSE,
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BRITISH MUSEUM NATURAL HISTORY

Introductory Note

The objects of the Society are declared by the second of its rules to be "the promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable."

The Sections at present working are as follows:— **Archæological and Historical, Astronomical, Botanical, Entomological, Geographical, Geological, Microscopical, Photographic, Physical, and Zoological.**

During the **Winter Session,** from October to April, GENERAL and SECTIONAL MEETINGS are held, comprising Lectures and Demonstrations on subjects of scientific interest, illustrated by lantern slides, diagrams, specimens or experiments

All meetings are open to all members of the Society.

Throughout the **Summer Session,** EXCURSIONS to places of interest in the neighbourhood are arranged, and indoor or garden meetings occasionally held.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting, held in October.

The Society possesses a Library available for the use of members. This is yearly becoming more extensive and valuable by the acquisition of standard text books and of books dealing with matters of local scientific interest. Books may, under certain conditions, be borrowed by members, and there is a Reading Room in which works of reference may be consulted.

Members are elected by the Council and pay an annual subscription of £1/10/- for full membership (admitting to all meetings and excursions for the year).

The Family Subscription (for members of a family living in the same house) is as follows:—First Adult Member, £1/10/-; Second Adult Member, £1; each additional Adult Member, 10/-; Children between 12 and 18 years, 5/-.

Notices, giving full details of all meetings, etc., are posted to every member, and a volume of Proceedings is published each year.

Application Forms for Membership, and further particulars, can be obtained from the

Hon. Assistant Secretary,
Miss K. A. HUNKIN, B.A.,
26b, Cavendish Road,
Bournemouth.

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1948-49.

President

DR. EDWARD HINDLE, M.A., SC.D., PH.D., F.R.S.

Chairman of Council

J. F. N. GREEN, B.A., F.G.S.

Deputy Chairman of Council

S. R. WYCHERLEY, F.R.M.S., F.L.S

Council

THE OFFICERS AND CHAIRMEN OF SECTIONS (*ex-officio*).

SIR G. ALABASTER, KT., O.B.E., K.C.
MISS E. BANHAM
G. BRUMELL,, A.R.I.B.A. (ret'd.).
J. CAMERON, M.D., D.SC.
MAJOR C. COOPER-HUNT, M.A.
B. GORTON, M.R.C.V.S.
MISS S. GRIEVESON
MISS K. HUNKIN, B.A.
H. G. SADLER
MISS I. SHEFFIELD
W. C. SIMMONS, B.SC., A.R.C.S., F.G.S.
W. G. SMITH
H. J. WADLOW

Chairmen of Sections

Archæological and Historical: F. WILLIAMSON, F.R.HIST.S.
Astronomical: INSTR.-CAPT. M. A. AINSLIE, R.N., B.A., F.R.A.S.
Botanical:
Entomological: W. S. COX.
Geographical: H. DE CASTRO.
Geological: HENRY BURY, M.A., F.G.S., F.L.S.
Microscopical: S. R. WYCHERLEY, F.R.M.S., F.L.S.
Photographic: A. W. LEGAT, M.INST.C.E.
Physical and Chemical: H. E. CLARKE, M.A., B.SC., F.R.I.C.
Zoological: MRS. W. BOYD WATT, M.B.O.U., F.Z.S.

Hon. Treasurer

W. J. WOODHOUSE, A.C.P.,
29, Twynham Road, Southbourne. Tel.: Southbourne 1199.

Secretaries

Hon. Secretary: W. J. READ, M.SC., F.R.I.C.
Hon. Assistant Secretary: MISS K. A. HUNKIN, B.A.

Hon. Librarian

A. A. FOYLE.

Hon. Editor

REV. WILFRED E. LOWTHER.

Hon. Curator

J. F. N. GREEN, B.A., F.G.S.

Hon Auditors

F. WILLIAMSON, F.R.HIST.S., A. A. FOYLE.

Bankers

NATIONAL PROVINCIAL BANK OF ENGLAND, BOURNEMOUTH.

COMMITTEES, 1948-49.

Finance and General Purposes:

Chairman: G. BRUMELL.

Hon. Treasurer: W. J. WOODHOUSE. *Hon. Secretary*: W. J. READ.

SIR. G. ALABASTER, H. BURY, J. CAMERON, J. F. N. GREEN, S. WHITAKER, S. R. WYCHERLEY.

Library:

Chairman: G. BRUMELL.

Hon. Librarian: A. A. FOYLE.

H. E. CLARKE, W. J. READ, H. G. SADLER, F. WILLIAMSON.

Museum:

Chairman-Hon. Curator: J. F. N. GREEN.

Chairman of Archæological Section: F. WILLIAMSON.

Chairman of Botanical Section:

Chairman of Entomological Section: W. S. COX.

Chairman of Geographical Section: H. DE CASTRO.

Chairman of Geological Section: H. BURY.

Chairman of Zoological Section: MRS. BOYD WATT.

E. ST. J. BURTON, F. WILLIAMSON.

Editorial

Chairman-Hon. Editor: REV. W. E. LOWTHER.

Hon. Treasurer: W. J. WOODHOUSE. *Hon. Secretary*: W. J. READ.

H. BURY, H. E. CLARKE, J. F. N. GREEN.

Garden:

Chairman: H. G. SADLER.

Chairman of Botanical Section:

MISS E. BANHAM, H. DE CASTRO, H. W. LEONARD, MRS. N. LEONARD, ST. J. K. NORTH-ROW, MISS E. WHITAKER.

Entertainment:

Chairman: MISS K. A. HUNKIN.

H. E. CLARKE, MISS I. SHEFFIELD, F. WILLIAMSON.

Summary of the Accounts for the Year ending 30th September, 1948.

Receipts.

	£ s. d.	£ s. d.
Subscriptions and arrears to Sept., 1948	367 18 0	
Ditto on A/c, Sept., 1949 ...	3 0 0	
		370 18 0
Donations.		
Special for Library Cabinets per Mr. Bury and Mrs. Read ...	15 0 0	
Individual Donations	2 12 6	
		17 12 6
Entertainment Committee.		
Garden Party	15 5 10	
New Year Party	17 10 3	
Bridge Party	2 15 0	
Art Exhibition	1 7 0	
		36 18 1
Rents.		
Empire Society	102 5 0	
Camera Club, June '47-Dec. '48 ...	84 0 0	
Summer School	60 0 0	
Pharmaceutical Society ...	9 7 0	
Beekeepers' Association ...	—	
Rent of Room	25 0 0	
		280 12 0
Hire of Hall, Lantern (sundries)		
Commercial Teachers	9 10 0	
Shakespeare Players	12 10 6	
Entomological Association ...	1 1 0	
Architects	1 18 6	
United Nations	3 0 0	
Townswomen's Guild	1 15 0	
Guides	1 10 0	
		31 5 0

Payments.

	£ s. d.	£ s. d.
Interest on Debentures to 1st Sept., 1948	118 4 9	
Less Tax at 9/-	47 17 8	
		70 7 1
Income Tax, Sch. D		1 7 0
Corporation Duty		5 11 0
Maintenance :—		
Property Tax, Sch. A	92 5 0	
Rates	115 6 3	
		207 11 3
Gas and Water	20 1 6	
Electricity	36 15 5	
Fuel	60 8 5	
Boiler Repairs	8 16 7	
Expenses of Radiator and overhaul lighting	27 6 8	
		153 8 7
Insurance of Property	20 15 3	
Caretaker (Wages, Insurance) ...	84 4 0	
Garden Expenses (Wages and Insurance)	45 6 0	
Telephone	10 10 5	
Repairs and Replacements ...	11 9 9	
Window Cleaning	6 0 0	
Sundries	12 2 4	
Museum Expenses	4 7 6	
Grants to Library	21 0 0	
Purchase of Microscope	15 0 0	
Purchase of Cabinets	23 3 10	
National Trust	2 2 0	
		256 1 1

	£ s. d.	£ s. d.
Proceeds of Teas	9 17 1	
Ditto Excursions	10 6 10	
		20 3 11
Sale of Surplus	21 0 4	
Telephone	2 9 7	
Part cost Proceedings	7 10 0	
Part cost Blocks	3 2 6	
Settlement of Trespass	2 2 0	
Storage of Furniture	3 0 0	
Sundries	2 8 3	
		41 12 8
Sale of £500 2½% Treasury Bonds		378 19 3
Interest on Bonds		24 15 0
Cash Balance forward, 1947 :—		
Petty Cash, 1947	2 8 7	
Bank Balance ... 210 12 10		
Less unpresented ... 4 12 9		
	206 0 1	
		208 8 8
		£1411 5 1

	£ s. d.	£ s. d.
Secretarial Expenses :—		
Salary and Insurance	44 14 3	
Postages	30 9 10	
Printing and Stationery ...	41 17 0	
Proceedings	59 14 3	
		176 15 4
Redemption of Debentures No. 33, No. 53		100 8 3
Decorations and Repairs under License		350 0 0
Cash Balance :—		
Current A/c ... 83 0 2		
Less unpresented ... 7 19 5		
	75 0 9	
Dividend A/c ... 5 2 10		
Less unpresented ... 4 11		
	4 17 11	
Petty Cash ...	9 16 10	
		89 15 6
		£1411 5 1

We have examined the above accounts with the books of the Society and the vouchers for payment and certify the same to be correct.

A. A. FOYLE,
F. WILLIAMSON,
Auditors.

Bournemouth, 30th September, 1948.

DEPOSIT ACCOUNTS.

Debenture Fund.	£ s. d.		£ s. d.
Balance brought forward	43 8 9	Balance on Deposit	43 13 1
Interest to 31 December, 1947	4 4		
	£43 13 1		£43 13 1

Building Fund.	£ s. d.		£ s. d.
Balance brought forward	35 6 9	Balance on Deposit	35 10 3
Interest to 31 December, 1947	3 6		
	£35 10 3		£35 10 3

Archæological Reseach Fund.	£ s. d.		£ s. d.
Balance brought forward	10 12 5	Balance on Deposit	10 13 5
Interest to 31 December, 1947	1 0		
	£10 13 5		£10 13 5

Redemption Fund.	£ s. d.		£ s. d.
Balance brought forward	14 5 11	Balance on Deposit	14 7 5
Interest to 31 December, 1947	1 6		
	£14 7 5		£14 7 5

Trustee Savings Bank and General Fund	£	s.	d.
Balance brought forward	112	2	7
Interest to 30 November, 1947	2	16	0
	£114	18	7

	£	s.	d.
Balance on Deposit	114	18	7
	£114	18	7

McDOUGALL LEGACY INVESTMENT ACCOUNT.

	£	s.	d.	£	s.	d.
December, 1946.						
To Legacy. Purchase of £2000 2½% Treasury Stock, 1975, at par				2000	0	0
				£2000	0	0
1 October, 1947.						
To balance				1800	0	0
				£1800	0	0

	£	s.	d.	£	s.	d.
Sale of £200 Treasury Stock						
Cash	183	4	0			
Loss on realisation	16	16	0			
				200	0	0
30th September, 1947.						
By Balance				1800	0	0
				£2000	0	0
Sale of £500 Treasury Stock:—						
Cash	378	19	3			
Loss on realisation	121	0	9			
				500	0	0
30 September, 1948.						
By Balance				1300	0	0
				£1800	0	0

Note.—The special thanks of the Society are due to the following:—

(a) The Entertainment Committee and the Tea Committee.

(b) The donors of assistance towards the purchase of Cabinets for the Library.

(c) The late Mrs. Dundee for the bequeathal of her Debenture "in memory of many happy hours."

September 3rd, 1948.

WILLIAM J. WOODHOUSE,
Hon. Treasurer.

Bournemouth Natural Science Society

List of Members.

Revised to 1949.

* Honorary Members. † Past Presidents.
o Original Members. l Life Members.
a Associate Members.

The year of election is given before the name of each member.

A

1932	Abbot, A. H.	Portman Cottage, 755 Christchurch Road
1932	Abbott, Mrs.	,, ,, ,,
1935	†Ainslie, Instr.-Capt. M.A., R.N. B.A., F.R.A.S.	Grenville, Talbot Drive, Wallisdown
1947	Alabaster, Sir G., Kt., O.B.E., K.C.	34, Pinecliffe Avenue, Southbourne
1947	Alabaster, Lady M., M.B.E.	,, ,, ,,
1947	Alcock, J. W.	24a, Ovington Avenue, Iford
1948	Alcock, Mrs. A.	,, ,, ,,
1948	Alcock, Miss J.	,, ,, ,,
1948	Alcock, Miss M.	,, ,, ,,
1946	Allan, Miss M. W.	6 St. Alban's Crescent
1937	Ansell, Miss E. M.	53 St. Catherine's Road, Southbourne
1943	Appleton, Miss M.	308 Poole Road
1948	Austin, Mrs. G.	Cranborne Court Hotel, Tregonwell Road.

B

1939	Bailey, E.	A. 22, San Remo Towers, Boscombe
1947	Ball, Miss W.	27 Heatherlea Road, Southbourne
1936	Banham, Miss E.	7 Marlborough Road
1912	aBarraclough, A., M.A., F.R.G.S.	93 East Avenue
1936	Barran, Sir Rowland	The Bridge House, W. Overcliff Drive
1948	Barry-Smith, Mrs.	Newlyn, Rossmore Avenue, Parkstone
1939	Bates, T. W.	36 Talbot Avenue
1939	Bates, Mrs. F.	,,
1946	Beaumont, Miss E.	17 Ravenscourt Road, Southbourne
1944	Bell, T. M., B.A., M.B., B.CH., M.R.C.S., L.R.C.P.	255 Belle Vue Road, Southbourne
1941	Bell, Mrs. R. M.	,, ,, ,,
1945	Bell, M. N.	,, ,, ,,
1945	Bell, R. J.	,, ,, ,,
1942	Bennett, Miss D.	Martello Firs, Martello Road, Branksome Park
1942	Bennett, Miss M.	,, ,,
1948	Bennett, Miss L.	17 St. Peter's Road, Parkstone
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1947	Benton, Mrs. M.	25 Surrey Road
1947	Berrill, Miss M. E.	Cliff End Hotel, Manor Road

1942	Bickel, T. H.	Flat 1, 31 Marlborough Road
1947	ABillen, R. A., D.F.M.	10 Rushmere Road
1947	Binks, Miss I.	9 Florence Road
1946	Blackmore, H. C., L.D.S., R.C.S.	7 Browning Avenue, Boscombe
1942	Boardman, E.	The Datcha, Compton Drive, Parkstone
1944	Borrett, A. C.	12 Montague Road, W. Southbourne
1944	Borrett, Mrs. L.	,, ,,
1938	Bottomley, Dr. F. C.	1 Beechwood Avenue, Boscombe
1943	Bowden, E. C., F.R.C.S.	Trevose, Riverside Road, West Moors
1948	Bowden, Mrs.	,, ,, ,,
1930*	†Bower, Prof. F. O., D.Sc., F.R.S.	2 The Crescent, Ripon
1947	Bowkett, Miss N.	54 Westby Road, Boscombe
1948	Bowkett, Miss W.	38 Oxford Avenue, W. Southbourne
1944	Bray, F. M., A.M.I.C.E.	90 East Avenue
1948	Brett, Mrs. A.	Bradburne House, Bradburne Road
1942	Brett, Mrs. R. K.	Aldersmead, Spettisbury
1942	Brimicombe, Mrs. E.	32 Ken Road, Southbourne
1926	*Broad, F., F.S.I. Hon. Member 1947	Manton Villa, 2 Oxford Road
1921	Bromley, Miss	81 Lansdowne Road
1945	Brook, Miss E.	23 Mayfield Road, Moordown
1917	Brown, Mrs. Edward	West Ridge, Chessel Avenue
1946	Brown, Miss K.	5 Alumhurst Road
1937	Brown, S. C. S., L.D.S., R.C.S., H.D.D.	454 Christchurch Road, Boscombe
1948	Brown, W. S., B.SC.	Three Ways, Dudsbury, Wimborne
1905	*Brumell, G., A.R.I.B.A. (ret'd.) Hon. Member 1933	Maori, 86 Richmond Park Avenue
1920	Brumell, Miss M.	,, ,, ,,
1946	Brummitt, Miss G.	Elderly Nurses' Home, Holdenhurst
1929	Buckingham, H.	7 Richmond Park Avenue
1939	Buckingham, Miss D. G.	,, ,,
1929	Burge, J. T.	6 Westdown Road, Kinson
1948	Burnley, T.	80 Saxonhurst Road, Ensbury Park
1937	Burrow, Mrs. D. M., B.SC., PH.D.	107 Alumhurst Road
1922	Burton, E. St. J., F.G.S., F.R.S.A.	St. Anne's, Seaward Avenue, Barton-on-Sea
1922*	†Bury, Henry, M.A., F.L.S., F.G.S. Hon. Member, 1947	The Gate House, 17 Alumdale Road
1930	Bury, Miss G. J.	,, ,, ,,
1946	Busby, Miss G.	4 Harbour Close, West Road, Canford Cliffs
1947	Bush, Mrs. E.	5 Richmond Chambers
1945	Butler, G. W.	Old Park Farm, Lytchett Matravers
1947	Butterworth, J. F.	2 Forest Road, Branksome Park
1948	Butterworth, E. P.	,, ,,
1948	Butterworth, Mrs. D.	,, ,,

C

1928	LCalkin, J. B., M.A.	Virginia House, Langton Matravers
1934	†Cameron, J., M.D., D.SC.	63 Grove Road
1945	Capron, Miss C. I.	Longcliff, Milford-on-Sea
1948	Carlos, A. S., B.SC., F.R.I.C.	25 Keswick Road, Boscombe
1946	Carron, Mrs. M.	11 Eaton Road, Bournemouth W.
1939*	†Carpenter, Prof. G. D. Hale, M.B.E., D.M., F.L.S., F.Z.S.	Penguelle, Cumnor Hill, Oxford
1948	Carter, W. A.	27 Brightlands Avenue, Southbourne
1945	Carver, R. B.	38 Elgin Road

1944	Chambers, E.	20 Queen Anne's Road, York
1948	Chambers, Miss V.	29 Watcombe Road, Southbourne
1932	Chambers, W. H.	14 Douglas Road, Southbourne
1946	Chaplin, W. A.	11 Folkestone Road, Harnham, Salisbury
1945	Cheesman, Mrs. A.	The Ken, Walkford, Christchurch
1943	Chennells, Mrs. M.	Deep Dene, Springdale Road, Broadstone
1948	Cherry, Mrs. B.	Tree Tops, Blake Dene Road, Lilliput
1941	Child, Dr. F.	64a Wellington Road
1945	Child, Miss L.	2 Chernocke House, Canford Cliffs
1912	AChilver, Miss K. M.	2 Shaftesbury Road
1942	Chomé, Mme.	14 Portchester Road
1943	Chomé, Miss J.	,, ,,
1943	Chomé Miss M.	,, ,,
1947	Churchill, E. A., O.B.E., B.SC.	Wembdon, Blandford Road, Broadstone
1947	Churchill, Mrs. J. M.	,, ,,
1931	Clark, Miss K. E.	15a St. Mary's Road
1947	Clarke, Miss H.	27 Garland Road, Poole
1945	Clarke, H. E., M.A., B.SC., F.R.I.C.	64b Surrey Road
1945	Clarke, Mrs. M.	,,
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1947	Cockerton, Rev. H. G.	1 Montague Road, Southbourne
1946	Cohen, E., F.Z.S., M.B.O.U.	Hazelhurst, Sway
1943	Cohen, Mrs. J.	,, ,,
1941	Coltar, Miss S. A.	98 The Grove, Redhill Park, Moordown
1946	Cook, Mrs. M.	Powell Lodge, Powell Road, Parkstone
1926	Cooper, H. A.	White Lodge, 8 Oban Road
1941	Cooper, Mrs. E. M.	,, ,,
1945	Cooper-Hunt, Major C., M.A., A.I.I.E.M.	19 Marine Drive East, Barton-on-Sea
1945	Cooper-Hunt, Mrs. E.	,, ,,
1948	Cornelius, Miss W.	19 Portarlington Road, Bournemouth W.
1948	Cox, W. S. I.	248 Castle Lane
1948	Cox, Mrs.	,, ,,
1922	Crallan, Mrs.	Lansdowne Hotel, Eastbourne
1941	Cresswell, Mrs. S. M.	13 Cecil Court, Charminster Road
1948	ACroft, A.	216_A High Street, Poole
1935	Cross, Miss F. C.	59 Strouden Avenue
1931	Curgenven, Miss A. J.	113 Richmond Park Road
1903	*oCurtis, W. Parkinson, F.E.S. Hon. Member 1922	17 Christchurch Road

D

1947	d'Aguilar, Lt.-Col. C. B.	Pavilion Hotel, Bath Road
1941	Dailey, Miss K.	134 Western Avenue, Ensbury Park
1946	Darby, Mrs. M.	22 Suffolk Road
1937	Dawes, Mrs. F. E.	24 Parkwood Road, Boscombe
1948	Deacon, Mrs. I.	135 Lowther Road
1930	de Castro, H.	Yarlington, Springdale Avenue, Broadstone
1945	de Jersey, Mrs. D.	1, Caroline Avenue, Christchurch
1935	Derry, Mrs. E. H.	Charnwood, Belle Vue Road, Southbourne
1947	Dewdney, H. A., F.R.C.O., L.R.A.M.	15 Wellington Road
1941	de Winton, Miss E.	A, 24 San Remo Towers, Boscombe
1948	Dickson, K.	Yenton Hotel, Gervis Road
1947	Dixey, Rev. A. D., F.R.G.S.	36 Southern Road, Southbourne
1947	Dixey, Mrs.	,, ,, ,,

1941	Dobson, E.	Heathercroft, Ravine Road, Canford Cliffs
1941	Dobson, Mrs. E. M.	,, ,, ,,
1942	Dobson, Rev. G. F., M.A.	25 Methuen Road
1943	Dodd, Mrs. R.	140 Richmond Park Road
1948	Dohoo, E. C.	Pennerley, Blake Hill Crescent, Parkstone
1946	Drew, Lt.-Col. C. D., D.S.O., F.S.A.	Dorset County Museum, Dorchester
1925	Druitt, Miss C. M.	Avebury, Sandleheath, Fordingbridge
1948	Dunn, Miss A.	Culverlea House, Pennington, Lymington

E

1936	Edwards, Charles, M.D.	Lyndon Lodge, 51b Christchurch Road
1936	Edwards, Mrs. H.	,, ,, ,,
1944	Edwards, Miss V.	c/o Westminster Bank, 27 Old Christchurch Road
1935	Elgar, Rev. A. J., F.Z.S.	Forest House, 1 Grove Road
1935	Elgar, Mrs. E. M. K., F.R.G.S.	,, ,,
1946	Ellison, Prof. F. O'B., M.D., F.R.A.S.	Pine Apple Cottage, Burton
1948	Engel, F., L.D.S., R.C.S.	3 Talbot Avenue
1946	Evans, Miss C.	63 Ophir Road

F

1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	,, ,, ,, ,,
1927	Finlinson, F. J.	Daneshill, 85 Queen's Park Avenue
1934	Finnis, Miss F. M.	15 Julian's Road, Wimborne
1947	Fithian, A. W.	Ewelme, Frankland Crescent, Parkstone
1947	Fletcher, Capt. G.	16 Branksome Dene Road
1947	Fletcher, Mrs. V.	,, ,,
1946	Flower, Capt.	418 Charminster Road
1946	Flower, Mrs.	,, ,,
1945	Follett, Mrs. V.	Windward, Mayfield Avenue, Parkstone
1942	Ford, Miss C.	13 Beaufort Road, W. Southbourne
1938	Ford, J. C.	3 Harvey Road, Boscombe
1937	Forrest, Miss C. D.	Hiproof, Benellen Road
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1945	Foyle, A. A.	2 Woodend Road, Winton
1948	Francis, Miss E.	Flat 3, Wilton House, Alum Chine Road
1945	Fraser, Miss L., M.D., B.S.	Bourne Hall Hotel
1942	Freeman, C.	Woodleigh, Durrant Road, Parkstone

G

1947	Gompel, Mrs. M.	12 Chigwell Road
1942	Gorringe, Miss K.	11 Branksome Dene Road, Westbourne
1927	Gorton, B., M.R.C.V.S.	22 Arnewood Road, West Southbourne
1948	Grant, Col. T. H.	B35, San Remo Towers, Boscombe
1948	Grant, Mrs. F.	,, ,, ,,

1947	Green, Miss F. W.	O.T. Dept., Royal Victoria and W. Hants Hospital, Boscombe
1947	Green, Miss J. E.	58 St. Alban's Avenue
1936	†Green, J. F. N., B.A., F.G.S.	Berkeley Hall Hotel, Cliff Cottage Road
1944	Greg, Mrs. F.	9 Hengist Road, Boscombe
1936	Grieveson, Miss S.	24 Surrey Road
1948	Griffin, J., M.A.	20 St. Ledger's Road
1948	Griffin, J. A.	,, ,,
1940	Grimes, Miss E. R., M.R.S.T.	Avenue Cottage, Highcliffe, Christchurch
1945	Grover, Miss G.	Butere, Barton Lane, New Milton
1941	Gwyther, W. T.	12 Foxholes Road, Southbourne

H

1931	Haines, Mrs. E. M.	Appleslade, Ringwood
1929	LHaines, G. E.	602 Christchurch Road
1948	Hall, Miss A. J.	Daneswood, Wharncliffe Road, Highcliffe
1946	Hall, Miss E.	,, ,, ,,
1937	Hall, Mrs. L. Beeching	Bryn Aird, Blake Hill Crescent, Parkstone
1948	Harding, H. J.	113 Nortoft Road
1945	Harding, Mrs. L.	85b, Southbourne Grove
1948	Harding, W. G.	,, ,,
1940	Hardy, G. G.	21 Cassel Avenue, Westbourne
1948	Hardy, Mrs.	,, ,,
1932	*Hatton, Mrs.	Dutch House, Cliff Road, Barton-on-Sea
1920	Hawes, Miss	The Moorings, 27 Nelson Road
1928	Henderson, Major H. E.	Tall Trees, 21 Wayside Road, Southbourne
1928	Henderson, R. G., M.A., M.B., CH.B. (Aber.), F.R.C.S. (Edin.)	87a Southbourne Road
1948	Higson, Miss A.	5a Dean Park Road
1923	Hill, C. S.	Northfield, 33 Chigwell Road
1944	Hill, Mrs. G.	Wootton, Cliff Drive, Canford Cliffs
1946	Hilton-Johnson, Miss C.	12 Oban Road
1948	Hobkirk, Miss A.	Amberley, Heather View Road
1947	Hockey, Miss A.	15 Surrey Road
1948	Hodgson, W. H.	3 Coy Pond Road
1936	Hunkin, Miss K. A., B.A.	26b Cavendish Road
1930	Hurt, Miss C. E. C. J.	Flat 31, Ingleby, 6 Wimborne Road
1947	Huzettin, Maj-Gen. P., C.B., C.M.G., B.A.	D7 Pine Grange, Bath Road

I

1925	LInsch, J. M., F.L.S., F.R.M.S.	18 Beechwood Avenue, Boscombe

J

1940	Jackson, Miss E. M., B.A.	Kilmory, York Road, Broadstone
1948	Jackson, J. O.	44 Herberton Road, W. Southbourne
1943	Jaggers, Mrs. E.	15 Elmsway, Southbourne
1942	James, Mrs. E.	Cranmere, Hatherden Avenue, Parkstone
1933	James, Mrs. M. G.	70 St. Alban's Avenue

1947	Jaques, Miss M.	Croft Cottage, Forest Road, Branksome Park
1945	Jenkins, Miss P.	Hinton St. Michael, Christchurch
1933	Johnson, Miss A. C., M.A.	25 Avenue Road, Christchurch
1930	Jones, Miss A. Parnell	Menstone, Frankland Crescent, Parkstone
1945	Jones, S. W., C.M.G.	6 Boscombe Cliff Road
1930	Jubb, Miss O.	12 Oban Road

K

1930†	*Keeble, Sir F. W., K.B.E., D.SC., F.R.S.	
1928	Kendall, Miss G. J., A.R.C.M.	20 Serpentine Road, Poole
1937	Kidd, D. J.	33 Bath Hill Court
1942	Killick, Mrs. M.	31 Gorsehill Road, Poole
1936	King, Mrs. A.	37 Linwood Road
1946	King, Miss A.	46 Surrey Road
1944	Kirke, Miss M.	565 Charminster Road
1948	Knight, Miss A.	Apia, Fairview Road, Broadstone
1943	Knight, Mrs. D.	Cornerways, York Road, Broadstone

L

1942	Lanham, Miss O.	31 Gorsehill Road, Poole
1948	Laurie, W. B.	49 Verona Avenue, W. Southbourne
1947	Leadbeater, R. G.	45 Thistlebarrow Road, Queen's Park
1942	Le Fèvre, Miss W.	791a Christchurch Road, Boscombe
1947	Legat, A. W., M.INST.C.E.	6, Thistlebarrow Road
1947	Legat, Mrs. E.	,, ,,
1947	Legat, Miss J. P.	,, ,,
1948	Leonard, H. W.	34 Charminster Road
1948	Leonard, Mrs. N.	,, ,,
1947	Logan, Miss A.	1 Branksome Wood Mansions
1947	Lovell, Miss D.	33 Commercial Road, Parkstone
1939	Lowde, Miss E., B.A.	Kilmory, York Road, Broadstone
1946	Lowe, Mrs. H.	Parkland, Burley, Ringwood
1934	ALowther, Miss D. M., B.SC.	Lonsdale, Mayfield Avenue, Parkstone
1947	Lowther, Rev. W. E.	7 Watkin Road, Boscombe
1948	Lowther, Mrs. E. L., S.R.N.	,, ,,
1948	Luce, Mrs. M.	Moorland Lodge, West Moors

M

1908	Mackay, Miss	8 King's Park Road
1929	Mackay, Miss C. J.	,, ,,
1948	MacPherson, N.	1 Stourwood Road, Southbourne
1909	McBean, Miss S.	74 Seafield Road, Southbourne
1932	McDougall, M., M.B., B.S.	8 Dunkeld Road
1932	McDougall, Mrs.	,,
1944	McLeod, Sir Murdoch, F.L.S., F.R.E.S.	Culverlea House, Pennington, Lymington
1935	McMichael, E.	1 Branksome Wood Mansions, Branksome Wood Road

1940	Making, M.	61 Howard Road
1930†	*Malmesbury, The Rt. Hon. the Earl of, D.L., J.P.	Heron Court, Christchurch
1946	Manley, Mrs. J.	5 Littledown Avenue
1946	Margary, Mrs.	12 Herbert Road, Westbourne
1948	Markwick, Miss D.	67 Norton Road, Winton
1946	Marshall, Miss D.	30 Beechwood Avenue, Boscombe
1947	Masters, C. O.	4 Gorsehill Road, Poole
1947	Masters, Mrs. S.	,, ,,
1944	Maudslay, A. J.	Carlton House, Barton Court Road, New Milton
1948	Medwin, Miss	274 Castle Lane
1929	Meyrick, Sir George, BART.	Hinton Admiral, Christchurch
1939	Middle, Miss A. M.	Tregenna, Castle Lane
1930	Miller, Dr. A. H.	Branksea Tower, Osborne Road, Parkstone
1934	Mitchell, Miss E. A.	109 Edgehill Road
1932	Mullins, Miss D. E. A.	Rosemaryne, 111 Edgehill Road
1942	Mummery, J. C., A.R.I.B.A. (ret'd.), F.R P.S.	12 Leamington Road
1936	Murdoch, Miss J. C.	3 Rotherfield Road
1935	Muspratt, C. K., M.A., F.R.G.S.	25 East Avenue
1935	Muspratt, Mrs.	,,
1948	Muspratt, Miss R.	44 Lansdowne Road

N

1948	Neil, J.	174 Cranleigh Road, Southbourne
1939	Newsome, S. H.	86 Belle Vue Road, Southbourne
1939	Newsome, Mrs.	,, ,,
1943	Nicholls, Miss G.	41 Corhampton Road
1948	North-Row, St. J. K.	8 Durrant Road

O

1929	Ogden, Miss E.	Vailima, Fairview Road, Broadstone
1948	Ogden, F.	30 Grosvenor Court, Vale Road
1948	Ogden, Mrs. G.	,, ,,
1945	Ollier, Miss D.	111 Overcliff Drive, Southbourne
1948	Osborne, Mrs. G.	B6 San Remo Towers
1948	Osborne, C. H.	77 Hengistbury Road, W. Southbourne
1948	Osborne, Mrs. E.	,, ,, ,,
1922	Ousby-Trew, Miss	Overthorpe, Michelgrove Road, Boscombe
1944	Owen, Mrs. E.	2 Rotherfield Road, Boscombe
1929	Owen, J. D.	Barnweill, 42 Strouden Avenue
1929	Owen, Miss M. D.	,, ,,
1945	Owen, W.	7 Dingle Road, Boscombe
1946	Owen, Mrs. E.	,, ,,

P

1948	Pankhurst, Miss D. K.	Alvediston, Waterford Lane, Lymington.
1945	Paris, Lt.-Col. A., R.E. (ret'd.)	10, Carbery Avenue, Southbourne
1946	Parke, Mrs. M.	Solway House, Copse Road, New Milton
1944	Partington, J.	49 East Avenue

1945	Penny, Miss A.	Beverley Hotel, Manor Road
1916	LPenrose, Miss F.	Little Picket, Hightown, Ringwood
1916	LPenrose, Miss M., B.SC.	,, ,,
1948	Percival, Mrs.	28 Branksome Wood Road
1947	Perkins, Miss E.	Flat 27, 6 Wimborne Road
1948	Pettersson, E. J.	5 Westfield Road, Southbourne
1948	Pettersson, Mrs. W.	,, ,,
1929	Phelps, Mrs. J. V.	Woodbury, East Avenue
1946	Pickering, Mrs. G.	23 Danesbury Avenue, Southbourne
1946	Pickering, Miss S.	,, ,,
1921	Pontifex, R. D., M.A.	Dalton House, 68 Christchurch Road
1948	Pooley, E.	Welbeck, Danecourt Road, Parkstone
1947	Pope, A. E.	11 Campbell Road, Boscombe
1947	Pope, Mrs.	,, ,,
1941	Popham, Miss C. H., M.B.O.U.	The Flat, Thorney Hill House, Bransgore
1944	Poulton, V. E.	84 Shelley Road, Boscombe
1945	Price, W. J., C.M.G., M.INST.C.E.	72 Canford Cliffs Road
1945	Prideaux, Mrs. A.	Upmoor, Ravine Road, Canford Cliffs
1946	Prideaux, Miss C.	,, ,,
1948	Provis, A.	Littledown, West Moors

Q

1924	Quick, Mrs.	Tregenna, Castle Lane

R

1927	Raine, A. D.	Milverton, Lymington
1927	Raine, Mrs.	,, ,,
1912	*Rankin, W. Munn, M.SC. (Leeds), B.SC. (Lond.) Hon. Member 1920	Hawthorne Cottage, Whitchurch Canonicorum, Bridport
1940	Ray, Mrs. B. M.	29 Penrith Road, Boscombe
1946	Rayner, R. A.	16 Oban Road
1946	Rayner, Mrs.	,,
1946	Read, E. W.	19 St. Alban's Avenue
1946	Read, Mrs.	,, ,,
1945	Read, W. J., M.SC., F.R.I.C.	15 Carbery Avenue, Southbourne
1946	Read, Mrs.	,, ,,
1947	Redding, Mrs. C.	35 Linwood Road
1947	Redvers, Mrs. E.	5 Waverley Road
1932	Reid, Mrs. F. E. A.	The Lawn, Forest Edge, Crow Hill, Ringwood
1924	*Reid, Mrs. E. M., B.SC., F.L.S.	Pinewood, Milford-on-Sea
1945	Rendall, Miss M.	67 Wimborne Road
1946	Retzbach, Miss A. M.	Rothbury, West Cliff Gardens
1945	Richards, Miss E., B.SC.	8 Overcliff Mansions, Manor Road
1928	Richards, Mrs. E. M.	82 Albert Road, Grappenhall, Lancs.
1942	Richards, Miss M.	Stour Lodge, Julian's Road, Wimborne
1947	Richardson, Miss J.	21 Boscombe Spa Road
1946	Richardson, J. G.	Baycroft, Rookhill Road, Friars Cliff
1926	Rix, Miss M. E. de B.	Wayside, Stourcliffe Avenue
1947	Roberts, Miss G.	Eagle Hurst, Poole Road
1948	Robertson, T. P., M.B., CH.B.	Farm Gates, Riverside Road, W. Moors
1948	Robertson, Mrs. D.	,, ,, ,,
1939	Robins, E. A., F.R.P.S., F.L.S., F.R.M.S.	Fairway, Stanley Road, Waterford, Lymington

1929	Robinson, Miss M. H.	Byways, Chaddesley Glen, Canford Cliffs
1929	Robinson, Miss W. A.	,, ,, ,,
1923	Roden, Miss E. M.	12 Walpole Road, Boscombe
1947	Rooke, Dr. K. B., M.B., B.CH., M.B.O.U.	Cranborne, Wimborne
1935	Rush, Major J. S., O.B.E.	29 Lansdowne Road
1935	Rush, Miss C. J.	,,
1943	Rushton, J.	Manana, Compton Gardens, Parkstone

S

1943	Sadler, H. G.	Chester House, Boscombe Spa Road
1947	Saltmarsh, Miss M., B.A., PH.D.	3 Sunnylands Avenue, Southbourne
1942	Sanford, E. G., A.M.I., MECH. E., A.M.I.E.E.	Wellbeck, Danecourt Road, Parkstone
1941	Sanford, Mrs. M. A.	,, ,, ,, ,,
1948	Scantlebury, Mrs. V.	Bourne Hall Hotel
1931	LScudamore, C. E., B.A., L.R.C.P.	24 Hampshire Court
1938	Seare, Mrs. H.	Almer, Blandford
1941	Sexton, Miss F.	60 Uplands Road
1943	Shaw, Miss M. M.	Whitegates, The Grove, Christchurch
1948	Shears, Miss E.	50 Christchurch Road
1933	Sheffield, Miss I. E.	177 Richmond Park Road
1937	Sherwood, Miss H.	420 Charminster Road
1944	LShorthouse, B.	Brookside Cottage, Exeter Lane
1937	†Simmons, W. C., B.SC., A.R.C.S., F.G.S.	Trigonia, Spur Hill Avenue, Parkstone
1937	Simmons, Mrs. I. M.	,, ,, ,,
1920	Simpson, N. Douglas, M.A., F.L.S., F.R.M.S.	Maesbury, 3 Cavendish Road
1948	Sindall, Miss D.	9 Grange Road, Southbourne
1942	Smith, S.	Sunnybank, Wallisdown Road
1945	Smith, W. G.	22 Stanpit, Christchurch
1947	Smythe, V. du B., F.R.N.S., A.R.P.S.	Sherwood, Irving Road, W. Southbourne
1947	Smythe, Mrs. M.	,, ,,
1947	Smythe, Miss C.	,,
1947	Sobbe, Miss D.	Manica, Tower Road, Branksome Park
1947	Sobbe, Miss V.	,, ,, ,,
1940	Somerville, Mrs. S.	Rumah Kechil, Pinewood Road, Ferndown
1946	Spry, Miss A., L.L.A.	17 Ravenscourt Road, Southbourne
1943	Starling, Miss E. M.	60 The Avenue, Moordown
1948	Stephens, Mrs.	174 Cranleigh Road, Southbourne
1947	Stuart-Harris, Miss M., B.SC.	Windycroft, Worth Matravers
1946	Stuart-Harris, Miss W., B.SC.	,, ,,
1947	Sykes, Capt. C., M.B.E.	105 Irving Road, W. Southbourne
1947	Sykes, Mrs. E.	,, ,, ,,
1948	Symonds, Miss V.	2 Chessel Avenue, Boscombe

T

1945	Taylor, Miss E.	25 Irving Road, W. Southbourne
1937	Terrell, G. H.	53 Wentworth Avenue, Boscombe
1946	Thane, Miss V.	23 Cecil Court, Charminster Road
1948	Thornycroft, L. B.	Plovers Barrows, West Parley
1936	Trayfoot, Mrs. L. W.	25 Eaton Road, Branksome Park
1944	Turner, Miss E. C.	8 Cassel Avenue, Branksome Park
1914	Twemlow, Miss E. E.	Devon Lodge 83 Alumhurst Road

V

1942	Vickers, H.	St. Giles, Compton Drive, Parkstone
1942	Vickers, Mrs.	,, ,,

W

1946	Wackrill, Miss D.	1 Crabton Close Road, Boscombe
1947	Wadams, Mrs. E.	75 Bournemouth Road, Parkstone
1924	Wadlow, H. J. Hon. Member 1947	The Gables, Queen's Grove, Parkstone
1921	Wales, Miss	The Nook, 4 Ormonde Road, Branksome Park
1921	Wales, Miss N.	,, ,, ,,
1945	Walker, F.	13 Richmond Park Avenue
1940	Walker, H.	31 Hawkwood Road, Boscombe
1913	Wallace, W. G.	61 East Avenue
1945	Waller, Miss C.	76 Ensbury Park Road
1946	Walsh, J.	13 Richmond Park Avenue
1936	Waltham, T. Ernest	c/o National Provincial Bank, Christchurch Road, Boscombe
1920	LWanstall, W. S.	Del Monte, 6 Roslin Road
1920	LWanstall, Mrs.	,, ,,
1936	Watkin, Ralph	Avila, Spur Hill Avenue, Parkstone
1941	Watson, Miss G. V.	Chine Hall, Boscombe Spa Road
1948	Watson, Miss W.	8 Littledown Road
1941	LWatt, Mrs. W. Boyd, M.B.O.U., F.Z.S.	52 Wimborne Road
1946	Watts, Miss N.	3 Dunbar Road
1936	Weekes, Mrs. M.	3 Rotherfield Road, Boscombe
1940	West, Mrs. F. M.	19a Knole Road, Boscombe
1947	West, Miss G.	2 Chessel Avenue, Boscombe
1918	*Whitaker, S. Hon. Member, 1947	22 Somerset Road, Boscombe
1924	Whitaker, Miss E. M.	,, ,, ,,
1924	Whitaker, S. E., P.A.S.I.	22 Selwood Road, Addiscombe, Croydon
1942	White, E. I., D.SC., PH.D., F.G.S., F.Z.S.	140 Westwood Road, Tilehurst, Reading
1931	AWhite, S. J.	7 Gilbert Road
1947	Williams, Miss J. C.	332 Poole Road
1942	Williamson, F., F.R.HIS.S.	24a Rushton Crescent
1947	Wilson, Miss G.	9 Glenmoor Road, Winton
1948	AWood, Miss B., B.SC.	4 New Park Road, W. Southbourne
1903	†oWoodhouse, W. J., A.C.P., M.I.H.	29 Twynham Road, Southbourne
1918	Woodhouse, Mrs.	,, ,, ,,
1932	Wren, G. G.	420 Charminster Road
1946	Wycherley, S. R., F.R.M.S.	40 Littledown Avenue, Queen's Park
1946	Wycherley, Mrs. L.	,, ,,

Z

1946	Zolawolaska, Miss R.	63 Ophir Road

Council's Report for the year ending 30th September, 1948.

The membership figure remains much the same as that of last year—490 as against 475. Although 86 new members joined during the year, there were 39 resignations, and more than 16 members have had to be struck off the list because they have not kept up the payment of their subscriptions.

The Society has suffered a loss by death of 6 members. The Council has to report with great regret the deaths of the Rev. Prof. M. C. Potter, M.A., D.Sc., Mr. A. S. Hemmy, B.A., M.Sc., Mr. F. L. Lowther, B.A., M.B.O.U., Mr. C. A. Baker, M.I.E.E., Mrs. Cameron, J.P., Mrs. Dundee, and Mr. H. Harrison.

Professor Potter joined the Society in 1926, and was President for the year 1940-41. Mr. Hemmy's membership began in 1932; he was President from 1944-45, and Chairman of the Archæological and Historical Section from 1933-34, and again from 1942 to his death. Mr. Lowther joined the Society in 1932, and was a member of Council from 1933-38. He was Chairman of the Archæological and Historical Section from 1938-42, and of the Geographical Section from 1943 to just before his death in September of this year.

There have been a considerable number of changes among the Officers of the Society. Unfortunately, Mr. H. G. Sadler has felt obliged to resign the Hon. Librarianship which he has filled for more than a year with conspicuous efficiency and success. The Council has asked Mr. A. A. Foyle to take his place.

In September, the Council received with regret the resignation of Miss M. Penrose from the office of Hon. Editor. Miss Penrose had been Editor since June, 1941, and members have had several opportunities of appreciating the success of her work in the Volumes of the Proceedings of the Society which have appeared since that date. The Council has been fortunate in obtaining the services of the Rev. W. E. Lowther as the next Hon. Editor.

Mr. F. Williamson was elected Chairman of the Archæological and Historical Section in April, as successor to the late Mr. Hemmy. In August, when Mr. Lowther resigned the Chairmanship of the Geographical Section, Mr. H. de Castro was elected in his stead. Mr. Legat accepted the Chair of the Photographic Section upon the resignation in August of Mr. E. A. Robins, and Mr. W. I. Cox has been elected to Chairmanship of the Entomological Section in succession to Mr. S. C. S. Brown. Miss Child was obliged to resign the Chairmanship of the Botanical Section in August owing to ill-health, and the Council has not yet found anyone to replace her. It has therefore been decided to elect a small committee to carry on the work of the section temporarily.

The number of General and Sectional lectures and excursions held during the year has maintained the high level of previous years, and both lectures and excursions have been extremely popular. There were 15 General and 60 Sectional meetings and lectures, and one General and 52 Sectional excursions. The number of motor coach excursions was much higher than last year's and the leaders of these very successful outings are to be warmly congratulated on the success of their efforts.

The Annual General Meeting was held on October 25th, 1947, and on November 1st, the President, Mr. W. J. Woodhouse, A.C.P., gave his Presidential Address to a large audience of members. His subject was, "Primary Education: Past and Present."

Evening meetings were held on the second Wednesday of the month in January, February, March and April. These lectures were open to the public without charge, and were very well attended. The public was also admitted to the Museum on these evenings during the half hour preceding the lecture.

A new development in the Society's activities occurred with the holding in October of last year of an Art Exhibition. Specimens of the artistic work of members were on view for three consecutive days, and the exhibition was so successful that the organisers, Messrs. S. R. Wycherley, and W. G. Smith have agreed to make it an annual event. The Entertainment Committee provided members with a New Year Party on January 10th, and a Garden Party on June 19th.

On September 20th of this year the Council called a Special General Meeting to debate the proposed increase in the amount of the Society's annual subscriptions. The meeting was well attended, and there was a very large majority vote in favour of the increase. As members have already heard, the Council took this step with great reluctance, but with the conviction that this was the only satisfactory method of stabilising the finances of the Society.

The Society has added to the number of its permanent tenants during the past year. The Royal Empire Society has, of course, continued its tenancy, and, in addition, the Bournemouth Camera Club has become a regular tenant of the lecture hall on Monday evenings. The Camera Club has, with the Council's consent, spent £120 on refitting the Dark Room, and members of the Society as well as those of the Club will benefit from this. The Pharmaceutical Society, after having been fairly frequent tenants, have now made a permanent arrangement for the use of the lecture hall on certain days.

The Swedish students again occupied part of the Society's premises for six weeks in June and July, and have already asked for permission to make the same arrangements for next summer. The Commercial Teachers Training College held one week's summer school here in August, and this also is likely to become a permanent arrangement.

The large programme of repairs to the Society's premises which was reported in last year's Council's Report has been being carried out slowly, but is as yet far from completion. Work was held up for some time before the requisite licence could be obtained, and at first only exterior decoration was allowed, in addition to the repair of the Museum window. Fortunately, however, the increase in the amount allowed to be spent on domestic repairs enabled the caretaker's bathroom to be begun. This is now finished, and further work will be undertaken as far as the regulations allow.

Some members may not have been aware that the Society has had a Mummy in its possession for a considerable time. In consideration of the fact that the Society included among its members no specialist in this branch of Egyptology, and that the unwrapping of the mummy might furnish valuable information, the Council authorised the Hon. Curator, Mr. Green, to offer the mummy to the Department of Egyptology of the University of London. The offer was accepted gratefully, and the mummy will be sent to London as soon as the University has room to store it. Miss Whitaker made some very fine drawings of the mummy case which were sent to London.

Last month the Finance Committee discussed the Society's position with regard to the recent Town Planning Act which will make it impossible for profits obtained by future development of land to accrue to the owners of the land. The Committee recommended to the Council that a solicitor's advice should be obtained, since a claim for compensation might have to be made. The solicitors advised the Council that, if the Society can claim to be a charitable organisation, it may obtain a certificate of exemption from the provisions of the Act. The solicitors have accordingly been instructed to apply for such a certificate of exemption.

The Society possesses an extensive collection of lantern slides, which for some time past have been kept in various parts of the premises. Recently, through the hard work of many of the members, and in particular of Mr. F. Williamson, these slides have been sorted and classified, and are now housed in a special room. Any members who would like to borrow any of the slides for lecture purposes should communicate with Mr. Williamson or with the Chairman of the Section to which the slides would belong.

As the clock in the lecture hall was found to be past repair, the Council bought an electric clock which has been fixed over the entrance door, and which has proved, in so far as the Electricity Board will allow, to be very reliable.

In addition to the New Year and Garden Parties, the Entertainment Committee held several Bridge Teas during the last winter season. These were not as successful as it had been expected that they would be, and the Committee will not organise any more this winter, unless a very definite demand for them is expressed by members. The Council has received with very much

regret the resignation of Mrs. Simmons from Chairmanship of the Committee. Mrs. Simmons has worked very hard and very successfully at the organisation of the entertainments for a number of years, and her loss will be much felt. Miss K. A. Hunkin has been elected Chairman in her place.

The Garden Committee under the Chairmanship of Mr. Sadler has kept the garden in order throughout the year. Only those members who have so kindly volunteered to work in the garden can really appreciate what a struggle against odds the work of the Garden Committee is, and they are to be congratulated upon their self-sacrificing labours.

Miss Parnell-Jones and the ladies of the Tea Committee have continued their efficient work in providing tea after lectures and at the various entertainments. The Council wishes to place on record its gratitude to them for their work.

The Council also wishes to thank the lanternists for their work during the year, and all those who have given books to the library, and gifts to the Museum.

Meetings and Excursions, Session 1947-8.

GENERAL.

Nov. 6th 1947.	Presidential Address: "Primary Education; Past and Present," by W. J. Woodhouse, A.C.P.
April 27th 1948.	Afternoon Coach Excursion to Wareham, Lulworth and Bere Regis. Leader, H. de Castro.
Sept. 20th 1948.	Special General Meeting.
Oct. 13th 1948.	New Forest Byways, a circular tour. Leader, Mr. W. J. Woodhouse.
Oct. 30th 1948.	Annual General Meeting.
Nov. 11th to 13th 1948.	Art Exhibition.

ENTERTAINMENTS.

Jan. 10th 1948.	New Year Party: Dramatic Entertainment.
June 19th 1948.	Garden Party.

CLUB DAYS.

Twelve were held during the session, at which were exhibited, with explanatory talks, mosses and liverworts, ferns, conifer shoots and cones, flowers, classical coins, geological specimens, and a film of Abbotsbury Swannery.

SECTIONAL.

Archæological and Historical.

(see also Photographic)

Nov. 11th 1947.	"Porcelain," by F. Williamson, F.R.Hist.S.
Nov. 29th 1947.	"The Kelt in Europe," by A. S. Hemmy, B.A., M.Sc.
Dec. 6th 1947.	"Baluchistan," by Rev. Duncan Dixey, F.R.G.S.
Jan. 1st 1948.	"The Kelt in Britain," by A. S. Hemmy, B.A., M.Sc.
Jan. 20th 1948.	"Disraeli and Gladstone: which was the greater Statesman?"—a discussion opened by Miss K. A. Hunkin, B.A.
Jan. 31st 1948.	"The Druid," by A. S. Hemmy, B.A., M.Sc.
Feb. 14th 1948.	"Medieval Ornament and Sculpture," by S. E. Whitaker.
Feb. 26th 1948.	"English Place Names," by F. Williamson, F.R.Hist.S.
Mar. 11th 1948.	"The Mapping of Mediæval Wessex," by Prof. Rothwell (Southampton University).
Mar. 20th 1948.	"Rome," by Major Cooper-Hunt, M.A.
April 10th 1948.	"Prehistoric English Dwellings: the Age of Bronze and Iron," by T. H. Bickel.

April 22nd 1948.	"The Native States of India"—the last paper prepared by Mr. A. S. Hemmy, and read after his death by Mr. H. E. Clarke.
May 14th 1948.	Coach Excursion to Avebury, Silbury Hill and Woodhenge. Leader, F. Williamson, F.R.Hist.S.
July 2nd 1948.	Visit to Hengistbury. Leader, Lt.-Col. A. Paris.
July 16th 1948.	Visit to Montacute House, nr. Yeovil, Somerset. Leader, F. Williamson, F.R.Hist.S.
Sept. 2nd 1948.	Visit to Badbury Rings. Leader, Miss E. M. Roden.
Oct. 9th 1948.	"The Acropolis of Athens," by Dr. W. A. Wigram, of Wells.
Oct. 23rd 1948.	"Prehistoric Britain," by F. Williamson, F.R.Hist.S.

Botanical.

Jan. 27th 1948.	"Botany in the Service of Forestry," by David W. Young, Deputy Surveyor of the New Forest.
Feb. 24th 1948.	"Woodlands," Ecological Film, shown by Henry Bury, M.A., F.G.S., F.L.S.
Mar. 25th 1948.	"A Bunch of Wild Flowers," by Miss Ursula Ogle.
July 7th 1948.	Visit to Wareham and Ridge. Leader, H. Bury.
July 13th 1948.	Visit to Brockenhurst. Leader, H. J. Wadlow.
July 22nd 1948.	Visit to Corfe (Scotland Farm). Leader, H. Bury.
July 28th 1948.	Parkstone Golf Links and Luscombe Valley. Leader, Miss E. Banham.
Aug. 5th 1948.	Roman Road and Upton Heath. Leader, H. de Castro.
Aug. 10th 1948.	Visit to Spettisbury. Leader, H. J. Wadlow.
Aug. 16th 1948.	Bloxworth and Bere Regis. Leader, H. J. Wadlow.
Aug. 20th 1948.	Lychett Matravers. Leader, Miss D. H. Marshall.
Aug. 24th 1948.	Visit to Swanage. Leader, W. J. Wadlow.
Aug. 31st 1948.	Hambledon Hill and Okeford Hill. Leader, H. de Castro.
Oct. 5th 1948.	Brockenhurst—Fungus Foray. Leader, H. J. Wadlow.
Oct. 19th 1948.	Brockenhurst—Fungus Foray. Leader, A. A. Pearson, F.L.S.

Entomological.

June 12th 1948.	Cranborne Chace. Leader, S. C. S. Brown.
July 24th 1948.	Fontmell Magna. Leader, S. C. S. Brown.
Aug. 7th 1948.	Portland. Leader, S. C. S. Brown.

Geographical.

Nov. 15th 1947.	The Face of Scotland. A. W. Legat, M.Inst.C.E.
Dec. 13th 1947.	Villages of Blackmore Vale. H. de Castro.
Jan. 3rd 1948.	The Hardy Country. F. L. Lowther, B.A., M.B.O.U.
Feb. 7th 1948.	William Barnes, Dorset Poet. Ald. H. Carter.
Mar. 9th 1948.	The Canary Islands. Miss I. Binks.
Mar. 13th 1948.	1947 Excursion Memories. A. W. Legat.
April 8th 1948.	Venice. S. R. Wycherley.
April 13th 1948.	Baluchistan. Rev. Duncan Dixey, F.R.G.S.
May 21st 1948.	Excursion to Cadbury Camp, Purse Caundle and Milborne Port. Leader, H. de Castro.
June 24th 1948.	Excursion to Downside Abbey and Bath. Leader, H. de Castro.
July 30th 1948.	Excursion to Salisbury Plain and Stonhenge. Leader, H. de Castro.
Aug. 27th 1948.	Excursion to Bulbarrow and Milton Abbas. Leader, H. de Castro.
Sept. 7th 1948.	Visit to West Parley. Leader, Miss K. Chilver.
Sept. 16th 1948.	Excursion to Arundel Castle. Leader, W. J. Woodhouse, A.C.P.

Geological.

Nov. 22nd 1947.	The Origin of the Great Oceans. H. Bury.
Feb. 5th 1948.	The Story of a Branksome Pebble. J. F. N. Green.
April 24th 1948.	Geology in Purbeck. W. C. Simmons, B.Sc., A.R.C.S., F.G.S.

Microscopical.

Nov. 20th 1947.	Cryptogamic Plants. S. R. Wycherley, F.R.M.S., F.L.S.
Dec. 18th 1947.	Cryptogamic Plants. S. R. Wycherley.
Jan. 15th 1948.	Insect Morphology. S. C. S. Brown.
Feb. 19th 1948.	Use of the Microscope. S. R. Wycherley.
Mar. 18th 1948.	Anatomy and Structure of the Pine. S. R. Wycherley.
April 15th 1948.	The Equisetum. S. R. Wycherley.
May 20th 1948.	Micro Drawing by Projection. H. Bury, W. J. Woodhouse and S. R. Wycherley.
June 17th 1948.	Plant Hairs. S. R. Wycherley.
July 15th 1948.	Pond Life. S. R. Wycherley.
Aug. 19th 1948.	Pond Life. S. R. Wycherley.
Sept. 18th 1948.	The Metamorphosis of Insects. S. C. S. Brown and S. R. Wycherley.
Oct. 21st 1948.	Polarised Light. S. R. Wycherley.

Photographic.

Jan. 24th 1948.	Mediæval Church Carvings. E. A. Robins.
Feb. 21st 1948.	The Cistercians. E. A. Robins.
Oct. 11th 1948.	Country By-ways. Major Cooper-Hunt, M.A.
Oct. 27th 1948.	The Face of Scotland. A. W. Legat.

Physical and Chemical.

Dec. 20th 1947.	Vitalism and Chemical Synthosis. H. E. Clarke.
Jan. 6th 1948.	Anaesthetics in Veterinary Surgery. B. Gorton.
Feb. 28th 1948.	Watching the Atoms. Miss M. Saltmarsh, B.Sc., Ph.D.
Mar. 4th 1948.	Food and Nutrition. H. E. Clarke, F.R.I.C.
July 1st 1948.	Visit to Bailey Gate Milk Factory. Leaders, H. E. Clarke and H. de Castro.
Sept. 22nd 1948.	Visit to Weston's Bakery. Leader, H. E. Clarke.
Oct. 16th 1948.	The Physicist's Approach to Astronomy. H. E. Clarke and S. R. Wycherley.

Zoological.

Nov. 8th 1947.	Biological Problems connected with Birds. H. N. Southern, M.A., M.B.O.U.
Nov. 27th 1947.	The British Hydracarina. S. R. Wycherley.
Dec. 4th 1947.	(a) Problems relating to the Distribution of Animals. H. Bury. (b) The Edible Crab. E. A. Robins.
Jan. 12th 1948.	Exotic Aquarium Fishes. A. C. Cock.
Jan. 17th 1948.	Sea Urchins and Starfish. H. Bury.
Jan. 22nd 1948.	The Reed Warbler. P. E. Brown.
Mar. 6th 1948.	More Birds of the Twilight. J. C. Follett.
Mar. 31st 1948.	Parallel Evolution. H. Bury.
April 3rd 1948.	Bird Nesting with a Camera. W. A. Chaplin.
April 17th 1948.	Stanpit Marshes. Leader, Miss C. Popham.
April 28th 1948.	The Foot of the Horse. B. Gorton, M.R.C.V.S.
Oct. 2nd 1948.	The Heart of Vertebrates. B. Gorton.
Oct. 14th 1948.	Stanpit Marshes. Leader, Miss C. Popham.

Evening Meetings.

Nov. 11th 1947.	The Effect of Modern Farming on the Dorset Countryside. H. de Castro.
Dec. 10th 1947.	Old Bournemouth. W. J. Woodhouse.
Jan. 14th 1948.	(a) The Emperor Moth. (b) The Life Cycle of the Sawfly. S. C. S. Brown.
Feb. 11th 1948.	Marshland Birds. J. C. Follett.
Mar. 10th 1948.	Bournemouth to Shetland with a Colour Camera. A. W. Legat.
April 14th 1948.	Leisure and Pleasure with a Microscope. S. R. Wycherley.

COMBINED SECTIONAL MEETINGS AND EXCURSIONS.

Botanical and Zoological.

April 20th 1948.	Hinton Admiral. Leader, H. G. Sadler.
April 29th 1948.	Pamphill and Cowgrove. Leader, H. J. Wadlow.
May 6th 1948.	Spettisbury. Leader, H. Bury.
May 10th 1948.	Bloxworth to Bere Regis. Leader, H. J. Wadlow.
May 24th 1948.	Wool. Leader, H. J. Wadlow.
May 28th 1948.	Corfe (Blashenwell). Leader, H. Bury.
June 1st 1948.	Wareham. Leader, H. J. Wadlow.
June 10th 1948.	Holmsley. Leader, H. Bury.
June 15th 1948.	Guss. Leader, Miss K. Gorringe.
June 29th 1948.	Swanage. Leader, H. J. Wadlow.
Aug. 12th 1948.	Christchurch Meadows. Leader, Mrs. Boyd Watt.
Sept. 10th 1948.	Pamphill and Cowgrove. Leader, H. J. Wadlow.
Sept. 22nd 1948.	Throop Meadows and Haddon Hill. Leader, Miss I. Sheffield.
Sept. 28th 1948.	Keyhaven. Leader, H. J. Wadlow.

Geographical and Botanical.

May 18th 1948.	Hurn and Merritown. Leader, Miss K. Chilver.

Zoological and Archæological.

June 3rd 1948.	Abbotsbury Swannery. Leaders, Mrs. Boyd Watt and W. G. Smith.

Entomological and Botanical.

June 26th 1948.	Brockenhurst. Leader, S. C. S. Brown.
July 3rd 1948.	Hamworthy Salt Marshes. Leader, S. C. S. Brown.

Geological and Botanical.

June 21st 1948.	Corfe (East Hill). Leader, H. Bury.
July 9th 1948.	Lulworth Cove and Durdle Door. Leader, H. Bury.
July 20th 1948.	Chapman's Pool. Leader, H. Bury.
Sept. 14th 1948.	Corfe (West Hill). Leader, H. Bury.

Zoological and Botanical.

Sept. 9th 1948.	Poole Harbour to Wareham. Leader, Mrs. Boyd Watt.

Reports for the year ending September 30th, 1948

Library

Gifts of books have been received from Miss Child, Mrs. Crallan, Mrs. Beeching Hall, Miss Higson, Miss Kirke, Mrs. Boyd Watt, Rev. D. Dixey, Dr. Scudamore, the late Rev. Prof. Potter, the late Mr. A. S. Hemmy and Messrs. Bury, Green, Lowther, Read, Simmons, Watkin, Wells, Whitaker, Woodhouse and Wren.

Books have been lent to the Library by Miss Child and Mr. Read.

Certain recently-published scientific books which, it is believed, will considerably add to the value of the Library, have been purchased.

Owing to the growth of the Library, it has been found necessary to provide additional shelving for the storing of such books as are not in frequent demand.

A few duplicate volumes have been sold. A year's parts of "Nature" have been bound.

For the better warming of the Library, an electric heater has been installed.

It was with much regret that the Library Committee received the resignation from the Committee of Miss Penrose, due to her removal from Bournemouth.

(Signed) H. G. SADLER,
Hon. Librarian.

The following is a list of new books acquired during the year:—

The Town of Maiden Castle. Eric Benfield.
The Atom and its Energy. Prof. Andrade.
This Chemical Age. William Haynes.
Insect Natural History. A. D. Imms.
Principles of Physical Geology. Arthur Holmes.
Dating the Past. F. Z. Zeuner.
Prehistoric Communities. V. Gordon Childe.
The Life of the Robin. David Lack.
The Geography of the Flowering Plant. Ronald Good.
Birds on the Wing. John Barlee.
Geology of the Country around Weymouth, Swanage, Corfe and Lulworth. W. J. Arkell and others.
Natural History in the Highlands and Islands. F. Fraser Darling
Dorset. Arthur Mee.
They Live in the Sea. D. P. Wilson.
Prehistoric Britain. J. and C. Hawkes.
Identification of Trees and Shrubs. F. R. Makins.
Scientific Encyclopædia. Van Nostrand.

Coastline of England and Wales. J. A. Steers.
A Beast Book for the Pocket. Edmund Sandars.
Practical Mathematics for All. H. Mackay.
British Game. Brian Vesey Fitzgerald.
Drawings of British Plants. Parts 1 and 2. Stella Ross-Craig.
Essays on Human Evolution. Sir A. Keith.
A Background of Physical Geography. G. P. Kellaway.
An Insect Book for the Pocket. E. Sandars.
London's Natural History. R. S. R. Fitter.

Museum

Work during the past year has been largely devoted to the Egyptological collection, which is now completely catalogued. Material packed away proved to be surprisingly good, an unexpected find being a case with a collection of 48 ushabtiu, that is, figures, buried with persons of importance, to be changed magically into servants in the next world. Among them may be mentioned two in brilliant blue faience of Queen Hent-taui, about 1040 B.C., and an artistic Osirian for Za-n-hebu, with long inscription, about 360 B.C. A wooden stele with a painted procession and prayer to Osiris was in bad condition. It has been mounted and glazed by Mr. T. E. Waltham. Much labelling has been necessary, in which Miss Banham has helped.

The Council decided that the mummy should be presented to some institution that would investigate it scientifically. For this purpose a drawing of part of the decorated case was prepared by Miss Whitaker and sent to the London School of Egyptology, University College, which gladly accepted the offer. The mummy will be transferred as soon as war damage at the School has been repaired.

Two volumes of Ceylon grasses and some specimens of foreign woods have been gratefully accepted by Kew Gardens museum.

Miss Berrill has continued work on preservation of insects and fossil leaves. A request having been received from Queen Mary's College, London, for specimens of the latter, Miss Berrill selected some duplicates which brought a letter of warm thanks. Archæological specimens have been lent to schools and lecturers. In this way it is possible to do a little to amend the sad lack of any public natural science museum in Bournemouth.

The experiment of opening the museum to the public for a short time once a month during the winter was only a moderate success. Some youthful visitors showed unusual knowledge of entomology and conchology and it is regrettable that, owing to inadequate space and staff, little can be done to help them.

The most important addition during the year was a beautifully preserved collection of mosses with up-to-date nomenclature and card index, prepared and presented by Miss Child. Archæological

material given by Mr. H. Bury included a fine example of an Upper Polæolithic flint knife. Some photographs and specimens from gravel-pits, no longer accessible, which have been presented by Mr. Calkin, are proving of value to local research.

(Signed) J. FREDK. N. GREEN,
Hon. Curator.

Garden

During the year the gardener has continued the work of keeping the shrubberies and flower beds tidy and the lawn trim. He has also cut away much dead wood from the rhododendrons. With a view to filling the gaps thus caused, Mr. W. J. Read has kindly supplied some young rhododendron plants. Three dead pines have been felled.

The irises in the front garden have flowered well, having benefited by the warm weather. Miss Sheffield has kindly presented a well-grown specimen of Clianthus puniceus (Lobster Claw plant) to replace a former plant which was lost, and Mrs. Boyd Watt some garden tools.

The rose trees were pruned by Mr. North Row, who has also provided specimens of Romneya trichocalyx, the California Tree Poppy.

(Signed) H. G. SADLER (Chairman).
R. WATKIN (Hon. Sec.).

Archaeological and Historical

This section suffered a serious loss in the death of Mr. A. S. Hemmy, who had been its Chairman for the past few years. His intimate knowledge of India and its peoples enabled him to make full use of the fine and extensive collection of lantern slides on India presented to the Society by the late Mr. Claude Lyon. The present Chairman took over the section during Mr. Hemmy's illness, and his appointment was made officially by the Council at its April meeting. Several lectures were given during the winter session of 1947-48, and some lectures given under other sections might equally well have appeared under this heading. The same applies to excursions, but visits of definite archæological interest were paid to Avebury, Hengistbury, Stonehenge, Badbury Rings and other places. A joint excursion with the Zoological Section was made to Abbotsbury.

More help is earnestly desired from members interested in archæology and history in connection with excursions and lectures.

(Signed) F. WILLIAMSON,
Chairman.

Botanical

The Botanical Section started its autumn and winter session of 1947-48 with two Club Days, planned for the biological study of the less well known members of the Plant Kingdom—the Cryptogams. The Chairman of the Section gave an introductory talk on those pioneers of land vegetation—the Liverworts and Mosses—and H. Bury, M.A., F.L.S., gave a short talk on Ferns. Both talks were illustrated by diagrams and an exhibition of locally collected specimens. A later Club Day was devoted to our local Conifers.

"Botany in the Service of Forestry" was the subject of a lecture by David W. Young, Deputy Surveyor of the New Forest, in which the results of chemical fertilisers were described and the biological stimulus of certain fungi which form mychoriza with the roots of young trees.

An experiment was made with an ecological film, the purpose of which was to trace from geological time to the present day the birth and development of our woodlands. This was shown with comments by Mr. Henry Bury.

An artistic treat was provided by a set of slides—photographs taken in situ—of wild flowers, shown by Miss Ursula Ogle, Vice-Chairman of the Bournemouth Camera Club. Miss Ogle gave an interesting talk on the flowers she had photographed, not as a scientific botanist but as a flower lover who had collected only with a camera and who knows flowers as one knows one's friends.

In April the rambles began again, thirty-four being organised altogether, many in conjunction with either the Zoological or Geological Section. These proved as popular as ever and closed with a Fungus Foray in the New Forest on October 19th—a joint outing with the Hampshire Field Club led by A. A. Pearson, F.L.S., who kindly identified the seventy-eight species collected and commented on some of them at the display, after tea, at the Watersplash Hotel, Brockenhurst.

Five exhibitions of Wild Flowers were given on Club Days by Mr. Wadlow and one of Fungi by Miss Sheffield.

To all who have helped to make the year's work a success the Chairman of the Section would like to express her thanks with the regret that she herself, through illness, has been unable to take part in many of the activities.

(Signed) L. M. CHILD,
Chairman.

List of least common plants seen on botanical excursions, compiled by H. J. Wadlow.

Hieracium præcox
Lobelia urens
Ranunculus sardous
Erodium maritimum

Adoxa moschatellina
Geranium pyrenaicum
Sambucus ebulus
Ornithogalum umbellatum
Euphorbia lathyris
Calamagrostis epigeios
Melittis melissophyllum
Lathyrus montanus, var. tenuifolia
Aquilegia vulgaris
Lithospermum arvense
Potentilla argentea
Cicendia filiformis
Chenopodium hybridum
Wahlenbergia hederacea
Epipactis latifolia
Linaria repens
Stellaria palustris
Lathyrus sylvestris
Specularia hybrida
Linaria minor
Campanula glomerata
Sempervivum tectorum
Polygonum amphibium
Artemisia maritima
Euphorbia portlandica
Euphorbia paralias

Fungus Foray, October 20th, 1947.

It was learnt too late for publication in our last volume that on the above Foray at Brockenhurst, led by Mr. A. A. Pearson, F.L.S., two species then found had not previously been recorded in Britain, viz., *Entoloma turbidum* and *Boletus leoninus*. Among other finds worth mention were several specimens showing the great variety of colour characteristic of *Armillaria mellea Quel* and some beautiful examples of *A. mucida* on beech. *Naucoria escharoides Quel* was found growing under alder; three very fine specimens of *Polyporus betulinus Fr.* growing on birch; fine sporophores of *Fomes* (*Ganoderma*) *applanatus*, showing several years of growth; and *Sparassis crispa Fr.*, a species usually found on the ground, growing fairly high on a tree. All these were seen in a part of New Park Enclosure and Queen's Bower.

Entomological

Insects have been abnormally scarce this year, not only in this country, but in Europe as a whole.

The usual migrants have been almost absent, in sharp contrast to the record year of 1947. Very few records of interest have come in.

During the Entomological outing to Fontmell Magna on July 24th, larvae of *Nepticule headleyella Stt.* (Lep. Tineina) were found mining the leaves of *Prunella Vulgaris*. This species is very local, only known from a lane near Croydon and in Arundel Park, Sussex.

(Signed) S. C. S. BROWN,
Chairman.

Geographical

During the period under review this Section lost by death its Chairman, Mr. F. L. Lowther, B.A., and Mr. H. de Castro was elected to take his place.

There were eight Geographical Lectures during the winter session given by members of the Society.

Summer outings organized consisted of six coach excursions, which were well patronised, especially those to Bath and Arundel Castle. As an experiment an October excursion was taken to the New Forest. Members responded very well and risked the uncertain weather at this time of the year.

(Signed) H. DE CASTRO,
Chairman.

Microscopical

During the past year the interest of the Society in microscopy has considerably increased. The monthly meetings have been held regularly with increasing attendance of members, so much so, that the large hall has been found most suitable for the gatherings of the Section. Demonstrations of various forms of Illumination of objects have been arranged, described and discussed, so that some ideas might be gained of how it is possible to secure the best image of the object examined under varying lighting conditions. Afternoons have been devoted to the microscopic revelations of Pollination Problems, including Scent Glands of Flowers, Plant Hairs, etc. Varying Antennæ of Insects have also been shown and a demonstration jointly with Mr. S. C. S. Brown by a Microscope Projector of certain problems of Entomology was much appreciated by members. An evening meeting in which the projection on the screen by a microscope projection of various microscopical subjects including Pond Life was acceptable to a public audience. Indeed, I think it may be claimed that there has been a steady and growing interest of members in this section of the Society's activities, so much so that the Council authorised the purchase of a microscope for members to use, and to add to the monthly interest. There has been an attempt, with some measure of success, to associate the Microscopic afternoon, during the summer months, with Botanical rambles, etc., so that Flowers, Mosses, Fungi can be brought and examined under the microscope. The programme already arranged for next year holds, it is believed, many interesting afternoons, and it is the hope of the Chairman that the members will find the Microscopical afternoons of increasing interest.

(Signed) S. R. WYCHERLEY,
Chairman.

Photographic

The most important feature in the year's working of this Section is the unfortunate resignation of Mr. E. A. Robins, F.R.P.S., R.L.S., F.R.M.S., from the chairmanship in August last. His qualifications are unique, for in him are combined a distinguished photographer, a world-wide traveller, a naturalist and a most able and charming lecturer. Since he moved to Lymington he has felt he could not give the personal attention he wished so much to do to the chairmanship of this Section, and so, although he has resigned, he still retains a close interest in us and we may expect to see and hear him from time to time.

There have been four meetings sponsored by this Section during the year, all very well attended and evidently appreciated. It is hoped to increase the number of Photographic meetings, and members who can offer lectures or demonstrations are asked to communicate with the new Chairman.

The Darkroom at 39 Christchurch Road, is available to all members. Those interested should inspect the very comprehensive equipment provided by the Bournemouth Camera Club, whose members also use it.

(Signed) A. W. LEGAT,
Chairman.

Physical and Chemical

A full appreciation of the important new work carried out in Physics, Chemistry and Biochemistry calls for a specialised acquaintance with present-day theory and methods of research. However, during the year a popular attempt has been made in lectures to describe the relations of enzyme action to food and nutrition, and to trace the relation between vitalism and chemical synthesis. Consideration has also been given to anaesthetics in animal surgery, and to the synthesis and development of modern industrial plastics. In physics and atomic chemistry lectures have been given on atomic tracking, with the technique of the Wilson Cloud Chamber, and on the nature and application of radioactive isotopes.

It is hoped during the 1949 excursion season to visit a number of industrial and technical plants in the vicinity of Bournemouth. A beginning was made this year with visits to the United Wilts. Dairy Co.'s Cheese Factory at Bailey Gate, and to Messrs. Weston's Bread Bakery at Malmesbury Park Road. These visits aroused considerable interest and were largely attended.

(Signed) HERBERT E. CLARKE,
(Chairman).

Zoological

Thirteen Lectures, illustrated by lantern slides and films have been given during the session. At the lecture on "Exotic Aquarium Fish" by Mr. A. C. Cook, living specimens were shown. The lecture on the "Reed Warbler," by Mr. Philip E. Brown, F.Z.S., M.B.O.U., was held in conjunction with the Royal Society for the Protection of Birds; the lecture on "Biological Problems connected with Birds," by Mr. H. N. Southern, M.A., M.B.O.U., was arranged with the British Trust for Ornithology. Living specimens, illustrating Pond Life, were shown and demonstrated on at meetings of the Microscopical Section.

Seventeen Excursions were arranged during the Summer, some of them in conjunction with the Botanical Section. They included a coach excursion to Abbotsbury Swannery and a motor launch expedition from Sandbanks to Arne and Wareham.

A collection of the small mammals to be found in the Society's area is being arranged and mounted for the Museum. Specimens already prepared include the Yellow-necked Field-house (*Apodemus flavicollis*) and the Long-tailed Field-vole (*Mus sylvaticus*).

The "British Birds" Reading Circle, inaugurated in 1942, continues. The monthly parts are bound up at the end of the year and added to the Library.

A Memorandum has been received from the East Dorset Field-Ornithology Group. The Group wishes to co-operate with, and assist societies interested in Dorset birds and to work in close liaison with individual observers. Further particulars from Dr. K. B. Rooke, M.A., M.B., M.B.O.U., Cranborne, Dorset.

SUMMARY OF OBSERVATIONS.

General.

Mr. Edwin Cohen, F.Z.S., M.B.O.U., records the following:

Wood Mouse (*Mus sylvaticus*), October, 1947.
Several trapped in and around the house, Hazelhurst, Sway.

Yellow-necked Field-Mouse (*Apodemus flavicollis*), October, 1947.
Quite numerous. Hazelhurst, Sway.

Dormouse (*Muscardinus avellanarius*), 5.5.48.
One brought in by cat, Great Ballard, New Milton.

Hedgehog (*Erinaceus europœus*), 16.5.48.
One in keeper's larder, Pennington.

Shrew (*Sorex aranius*), April, 1948.
One dead in garden. Hazelhurst, Sway.

Weasel (*Mustela nivalis*), 30.8.48.
In garden. Hazelhurst, Sway. The first recorded.

Frog-spawn, 11.3.48. Six days earlier than 1947.
Frogs, 11.3.48. A mating gathering of 250+ at Irons Well, Fritham.
Grass-snake, 22.4.48 and 16.5.48. Hazelhurst, Sway.
Lampreys, 9.4.48. Two on the Avon Water, Mead End, Sway.

Ornithological.

The following notes have been edited by Miss C. Popham, M.B.O.U., the Society's Recorder of Birds, who also is the chief contributor of the records.

No very rare birds have been reported, and it seems a pity that so few members have sent in records this year.

Mr. J. McHoul reported that near Picket Post a cuckoo flew in front of his car for about 400 yds. while the car was travelling at about 50—60 m.p.h.

The records of two Great Skuas (*Stercorarius s. skua*) are interesting. The first was a bird picked up on the beach under Hengistbury Head by Mr. R. Brewer, Feb. 12th. The bird was in good condition, with no sign of injury or possible cause of death. The wing-span was 54in., length about 24in. The bird was sent to the British Museum (Natural History) by Miss C. Popham.

The second bird was seen by Dr. K. B. Rooke on Stanpit Marshes later in the year. This bird was standing on the mud in the company of several gulls.

Miss Marshall reported a Purple Sandpiper (*Calidris m. maritima*) on Stanpit Marshes, Sept. 5th. Miss Hunkin reports the presence of a Great Spotted Woodpecker (*Dryobates major anglicus*) in her garden, Oct. 15th. The bird was being mobbed by all the other birds in the garden.

Members who attended the excursion to Stanpit Marshes on Oct. 14th watched a Sparrow-Hawk (*Accipiter n. nisus*) being mobbed by a Crow (*Corvus c. corone*). Both birds were flying at a great height. A Buzzard (*Buteo b. buteo*) was seen being mobbed by a Crow over Hinton Admiral by Miss Popham, Oct. 19th.

Wood-larks (*Lullula a. arborea*). Bransgore, May 7th (C.P.).
Grey Wagtails (*Motacilla c. cinerea*). Christchurch and Bransgore (C.P.).
Nightingale (*Luscinia m. megarhyncha*) first heard Bransgore, April 14th (C.P.).
Dartford Warbler (*Sylva undata dartfordiensis*). A cock bird seen near Holmesley, Aug. 30th. (C.P.).
Nightjar (*Caprimulgus e. europœus*), first heard at Bransgore, May 9th. Pair of young flushed same place July 3rd (C.P.).
Hoopœ (*Upupa e. epops*). Seen on the hills between Swyre Head and Kimmeridge, Dorset, by A. Avenell, Aug. 6th.
Little Tern (*Sterna a. albifrons*). In large numbers, Christchurch Harbour, May 2nd (C.P.).
Sandwich Tern (*Sterna s. sandvicensis*). A few in Christchurch Harbour, May 2nd (C.P.).

Sanderling (*Crocethia alba*). Several in Christchurch Harbour, Aug. 29th (C.P.).

Curlew (*Numenius a. arquata*). The observer was mobbed while riding by pair of curlews near Burley Beacon, New Forest, close to a breeding spot, July (C.P.).

Miss Marcia Penrose, B.Sc., records the following seen in or near Hightown, Ringwood.

Arrival of Summer Migrants, 1948.

Date.	Species.	Whether known to have nested in or around garden.
Mar. 14th.	Wheatear (*Oenauthe œnanthe*)	
,, 19th.	Chiff-chaff (*Phylloscopus collybita*)	Yes
?	Willow-warbler (*Phylloscopus trochilus*)	Yes
,, 29th.	Wood-warbler (*Phylloscopus sibilatrix*)	Yes
,, 29th.	Sand-martin (*Riparia riparia*)	
April 11th.	Ring-ouzel (*Turdus torquatus*)	No
,, 11th.	Cuckoo (*Cuculus canorus*)	Yes
?	House-martin (*Delichon urbica*)	
,, 13th.	Swallow (*Hirundo rustica*)	Yes
,, 18th.	Black-cap (*Sylvia atricapilla*)	Yes
,, 18th.	Whitethroat (*Sylvia communis*)	Yes
,, 18th.	Pied Flycatcher (*Muscicapa atricapilla*)	No
,, 20th.	Yellow Wagtail (*Moltacilla raii*)	*Yes
,, 20th.	Sedge-warbler (*Acrocephalus schœnobœnus*)	*Yes
,, 23rd.	Reed-warbler (*Acrocephalus streperus*)	*Yes
,, 27th.	Swift (*Micropus apus*)	Yes
May 1st.	Nightingale (*Luscinia megarhyncha*)	Yes
,, 2nd.	Common Redstart (*Phœnicurus phœnicurus*)	Yes
,, 5th.	Turtle-dove (*Streptopelia turtur*)	Yes
,, 8th.	Garden-warbler (*Sylvia simplex*)	
,, 9th.	Spotted-flycatcher (*Muscicapa grisola*)	Yes
?	Nightjar (*Caprimulgus europœus*)	Yes

*In meadows at Ringwood.

A pair of Hawfinches nested in a neighbouring garden and during the second half of June and the whole of July they and their four young ones were constantly with us. We noticed how frequently they occupied the bird-bath and were constantly drinking water. We first saw one of the adult birds in our garden on February 21st, 1948.

Hightown Common is a roosting-place for Pied Wagtails. The numbers vary from well over 100 to about 50. From September to March they collect each evening on the electric cables about quarter-hour before sunset, coming in in little parties from all directions. After resting a few moments on the wires, they drop down to the ground or take short flights, returning each time

to the wires. After the sun has set and the light begins to fail, they all suddenly fly down among the heath and furze, but do not finally settle for some time, fluttering about and continuing to twitter until daylight has almost gone. Finally they disappear into a thicket of tall gorse but even after that and after there is no more twittering they can be heard to snap their bills, making a sound like tiny castanets. Last winter the collecting place was on the common, about half-mile away from the main road, but as this part was completely burnt in the spring, this autumn they collect on the wires bordering the main London road and roost in the gorse close to the road.

(Signed) WINIFRED BOYD WATT,
Chairman.

Art Exhibition

The Art Exhibition of the Bournemouth Natural Science Society was held on November 11, 12th and 13th and once again proved a great success. It is invidious to mention the work of exhibitors by name, when universally the exhibits submitted were of such a very high order, covering as they did a wide range of subjects. Craftsmanship in some of the Needlework and Tapestries submitted was very good. The Exhibition embraced among other things, Photographs, including Micro. Photographs, Water Colours, Oil Colours, an exceedingly beautiful miniature on ivory, and a selection of Still Life Studies of exceptional merit submitted by a member of many years' standing.

A Loan Exhibit sent by Y. E. Cohen, of Bird Studies, including one by Peter Scott, added greatly to the standard of the Exhibition. But our own members' work was so exceedingly good that even without the Loan section, the exhibition showed a remarkable standard of excellence. It is perhaps permissible to refer specifically to the unique display of Tropical Fish shown in a thermostatically controlled aquarium by Mrs. W. J. Read. The Society is indebted to all those who sent their work for exhibition and those who by personal interest and help made it such a success. The arrangements made by the Tea Committee was excellent.

Presidential Address

Primates

By Edward Hindle, F.R.S.

(*A lecture delivered before the Society on November 6th,* 1948.)

The very diverse types of mammals grouped together under the term Primates almost all live in tropical and sub-tropical countries, with the notable exception of man. They are absent from Australia, New Zealand, the West Indies, Pacific Islands and New Guinea, except for introduced species such as the Green Monkey *Cercopithecus aethiops sabaeus* which was liberated in the West Indies and subsequently became established in St. Kitts and Barbados.

Most of the Primates agree in certain characteristics, but owing to the survival of a number of primitive types it is difficult to draw up any definition which will cover the whole group. Thus, except for man, they are all hairy, and the fur and certain parts of the skin may be very brightly coloured. Five fingers and five toes are normally present and except for man the big toe, or hallux, is well developed and opposable to the other toes. The fingers and toes usually bear flattened nails. The eye is situated in a bony socket separated off from the rest of the skull by a ring of bone. The brain is highly developed. Usually only a single young one (sometimes two) is born at a time in a fairly advanced state of development, so that it can soon cling to its mother and be carried about. There is generally only one pair of mammæ situated on the thorax.

I have given only a very brief summary of some of the general characters of Primates but I should like to emphasize one feature of the Order, namely the general lack of specialization in most members of the group. In the case of other Mammalian Orders it is common to find the animals specialized for some particular habitat or function. Thus Ungulates have become herbivorous, and depend upon speed to escape from their enemies. As a result their limbs have been specialized for running and their fingers and toes modified in structure and reduced in number. Whales, dugongs and manatees have become entirely aquatic; seals and walruses semi-aquatic; bats have developed wings; rodents are specialized for gnawing, and carnivores for the pursuit and capture of prey. Insectivores, the ancestral stem from which Primates seem to be descended, have also specialized in various ways, but certain members of the Order, especially the tree shrews, still retain many primitive characters, and are now generally grouped with the Primates. But with comparatively few exceptions, the Primates have escaped the dangers of specialization and even man, the highest member of the Order, retains many primitive characters including the advantage of five free digits to his hand.

The Order Primates is divided by Pocock into three sub-orders as follows :—The *Lemuroidea,* including Lemurs, Galagos, Lorises, Pottos and Tree Shrews; the *Tarsioidea,* or Tarsiers; and the *Pithecoïdea,* or *Anthropoidea,* which comprises the Monkeys and Apes, including Man.

This evening I shall devote most of my time to the first two of these sub-orders, for in the past few months the Zoological Society of London has obtained examples of each group that have never been exhibited previously, and in addition present features of great scientific interest.

The first group we will consider is the **Sub-Order Lemuroidea.** Excluding Tree Shrews, these animals are distinguished by having narrow and somewhat fox-like muzzles; the fourth digit of the hand and foot is longest, and the second digit of the foot always bears a claw, instead of a flat nail. There are also certain peculiarities in the teeth. The orbit, although encircled by bone, is not closed off, but communicates with the space behind it.

The typical lemurs are found only in Madagascar and include most of those seen in captivity. At one time they were fairly common as pets and were often brought back to this country by sailors on ships returning from Madagascar. In Egypt after the First War it was usually possible to obtain specimens at Suez or Port Said, but in recent years their export from Madagascar has been strictly prohibited by the French authorities. The Brown and Ring-tailed Lemurs are the species most commonly seen in captivity and make very attractive pets when young, but as they grow older, like most Primates, tend to become unreliable. Lemurs are assentially arboreal animals and are extremely active climbers. I have seen a Brown Lemur when startled spring from the floor of a room onto the picture-rail and leap round from one wall to another, distances of about twelve feet, using only the small foot-hold afforded by this narrow ledge.

The largest and most handsome species is the Variegated Lemur, *Lemur varius,* with thick black and white fur, and a white ruff round its neck. The head and body of a full grown specimen may measure two feet and the tail is of equal length. One which I kept in a flat in Cairo had the curious habit of sitting erect on the balcony railing and facing the rising sun with its arms widely extended, and then periodically closing its arms over its body and bending forward with a curious crooning noise. Occasionally it gave a most unearthly kind of shriek, a louder noise for its penetrating qualities than that made by the larger Carnivores.

The tiny Mouse Lemur is sometimes seen at the Zoological Gardens. It is about the size of a dormouse and in nature has the habit of becoming dormant during the dry season when food is scarce, and living on the reserve fat stored up in its tail.

The Endrinas which include the largest of the Lemurs, have not yet been seen alive in this country, and so far as I am aware there is only a single record of the allied Sifakas reaching the

Zoological Society's collection at Regent's Park. Some of the species show very remarkable coloration. Coquerel's Sifaka for example, is predominantly white on the back, with the muzzle and ventral surface black. They are now protected in their native Madagascar—at least their export is prohibited—but it is difficult to prevent the natives willing them for food.

One of the most extraordinary members of the *Lemuroidea* is the Aye-aye, *Daubentonia,* with gnawing teeth resembling those of rodents, and other structural peculiarities. It is entirely arboreal and nocturnal and with its ghost-like appearance and peculiar cry is much dreaded by Madagascar natives. The middle finger of the Aye-Aye is extremely fine and elongated and supposed to be used for extracting the larvæ of wood-boring beetles from their burrows, as these insects are said to form a large part of its food. However, a pair in the Society's collection some years ago refused all insects and fed entirely on a diet of milk, eggs and fruit.

The Lemurs also include the Galagos or Bush-babies which occur in the African forests; the smaller members of the group have a superficial resemblance to squirrels and are often kept as pets. Like most Lemurs they are capable of making very loud cries, suggesting a fractious baby.

The Lorises have the forefinger well developed and no external tail. There are two species, the Slow Loris or Coucang occurring in S.E. Asia and Borneo, and the Slender Loris confined to Southern India and Ceylon.

Finally we come to the Pottos, *Perodicticus,* represented by various races in West Africa and distinguished by the hand having a thumb and only three complete fingers, the first finger being reduced to a stump. The tail is rudimentary being represented by a short thick stump. One peculiar feature of this animal is the extraordinary development of the dorsal processes of the neck vertebræ which project as a row of spines covered only by thin skin. Their function is somewhat problematical.

The Zoological Society has recently acquired a very rare member of this family, the Angwantibo, *Arctocebus calabarensis,* which only occurs in the Calabar district of the British Cameroons. The specimen now on view in London is the first living example to be exhibited in this country, although one reached the Zoo about twenty years ago. It was brought into the headquarters by a traveller, just back from the Gold Coast, who had bought it from a native pedlar. It was seen by Mr. Seth-Smith, the Curator of Mammals, and on being told the nature of his pet the caller offered to present the animal to the Zoo but asked that he might first show it to his family who lived in London. He departed in a taxi without leaving his name or address and that was the last ever heard of either the caller or his precious animal.

The Angwantibo has very stumpy little fingers and toes since the basal joints are united together by the skin of the hands and

feet, leaving only two free joints. The thumb and great toe, on the other hand, have three free joints and are well developed. Like other members of the *Lemuroidea* there is a well developed claw on the second digit of the foot instead of the flat nail found on the other digits. Almost nothing is known of the habits of this animal. The specimen in our possession feeds on mice, fruit, lettuce and occasional mealworms, but seems to prefer mice. In nature they are probably omnivorous feeding on any of the smaller forest animals and also fruit. It is rather more active than the ordinary Potto which is usually a very slow moving animal, except if annoyed when it is capable of a rapid lunge forward and can give a severe bite.

Sub-Order Tarsioidea (Tarsiers).

These are the sole survivors of a large group that in Eocene times was spread over many parts of the world, including Europe and America. They are somewhat intermediate between Lemurs and Monkeys, and approach the Anthropoids in the characters in which they differ from Lemurs. Thus the eyes are contained in almost complete bony orbits as in the higher Primates, and are frontal in position, though it is doubtful whether they have developed stereoscopic vision. The eyes of the specimens at the Zoological Gardens have recently been examined by Professor Arnold Sorsby, who confirms that a yellow spot is not present, thus differing from the eyes of higher Primates. There is a larger development of the occipital lobes of the brain than in Lemurs, and also the skull is more nearly balanced on the spinal column, so that the animal usually assumes a semi-erect position. They are small furry animals with large membranous ears which can be moved and also folded up, large "goggle" eyes and a long rat-like tail. The fingers and toes are long and thin and end in flat disc-like pads which are of use in climbing. Their ankle bones are greatly elongated in accordance with their habit of moving about by hopping. Unlike other Primates, the second and third toes are provided with claws while the other digits have nails, and the claws are used for combing the fur. The hands are used, not only for grasping, but also for conveying food to the mouth.

The existing members of this group are now confined to certain local areas in Borneo, the Celebes, the Philippines and adjacent regions. During the clearing of forest land in the island of Mindanao last year, a considerable number of Tarsiers were caught and forwarded alive to America by air. Three of these were sent to London and have now been in captivity for about eighteen months, and we have been able to prepare a cinematograph film showing their general structure and behaviour. These specimens are still in apparent good health and since there is a male and two females we are hoping that it may be possible for them to breed.

Sub-Order Pithecoidea or Anthropoidea.

I now come to the highest group of Primates which is distinguished from the Lemurs by the structure of the muzzle, in which there is no area of moist skin surrounding the nostrils and dividing the upper lip. The latter is not attached to the gums and both lips can be protruded so that water can be sucked into the mouth instead of being lapped. In the hands and feet the middle digit is usually longer, never shorter, than the fourth. The orbits of the skull are closed at the back by bone.

Without going into the difficult problem of classification we will consider a few examples of this sub-order under two main sub-divisions: the Platyrrhini or New World Monkeys; and the Catarrhini or Old World Monkeys and Apes.

The American Monkeys have three premolar teeth above and below in each jaw. The nostrils are usually widely separated and directed outwards. The tail is often prehensile, which is never the case in Old World Monkeys. Marmosets and Tamarins are the simplest members of the group. Superficially they resemble squirrels both in size and their strictly arboreal habits. They frequent the forests in Tropical America, often living in troops. They differ from most Primates in having sharp curved claws on all their toes except the great toe which has a flat nail. Also the thumb lies in line with the other digits so that the hand is paw-like. They bring forth two or three young at a birth. The male takes the main part in bringing up the family and carries the young about with him except when the infants require feeding by their mother. The young at first cling to the long fur of the breast but later mount on his back. These animals are often kept as pets but are not very intelligent and never thrive well in captivity unless they have plenty of insect diet. Certain species in South America have been found infected with Yellow Fever in nature and may serve as reservoirs of infection for this disease.

The various typical New World Monkeys range from the tiny Sakis and Squirrel Monkeys up to the large Spider Monkeys and Woolly Monkeys. Undoubtedly the best known are the Capuchins which at one time were the usual organ-grinder's monkey. They are among the most attractive inmates of the Monkey House as they are very intelligent and soon learn to recognise particular visitors. In nature they go about the forests in troops of twenty or thirty and are said to travel in single file. Although many persons keep them on an exclusively vegetarian diet, they are really omnivorous and in the wild feed on insects, small reptiles, young birds and bird's eggs, in addition to leaves, roots and fruit.

Spider Monkeys are more thoroughly adapted to an arboreal life than any other New World Monkeys. The slender body, long thin arms and legs and long prehensile tail give the animal an amazing capacity for travelling along the top of jungle forests. The tip of the tail is used as a fifth "hand" so that these monkeys seem to have a conjuror's ability to do many things at the same

time. Like Capuchins they travel about in troops, or family groups.

The Howlers are the largest of the American Monkeys and so far as the Zoological Society's collection is concerned, one of the least known, for they have never been kept long in captivity. They are distinguished by various modifications correlated with the expansion of the hyoid at the upper end of the larynx into a great hollow sound box, the lower jaw being expanded to contain it. As their name implies, these monkeys are able to produce resonant howls which can be heard at least a mile away. They are also among the species which have been found to be very susceptible to Yellow Fever, and in Trinidad there was an old belief that epidemics of this malady were preceded by deaths among the Howler Monkeys.

The Catarrhini or Old World Monkeys and Apes are distinguished by the presence of only two premolar teeth above and below on each side, and possess a complete bony floor to the Eustachian tube. Also, as their name implies, typically the nostrils are situated closer together and appear as convergent slits pointing downwards.. The tail is never prehensile. The members of this group often possess large cheek pouches and hairless regions, or callosities, on their hind-quarters.

The Cynomorpha or dog-like monkeys include the larger number of the species commonly seen in captivity. Among well-known examples are the Baboons, Mandrills and Drills which range throughout Africa, and have abandoned forest life for open country. They often live in large troops and cover big distances in their search for food, and although normally vegetarian, will eat insects and small mammals, birds or reptiles. Baboons have a highly developed social system of their own which has been studid by various authors, including Professor Zuckerman who has published an interesting account of the subject based partly on the results of his observations on those in the London Zoo. A Baboon colony is largely ruled by a few dominant males which monopolize all the females. Some of these males may have several females in their train and others only one, but the recognized mate of any of them is kept under close supervision and breaches of conduct often result in the death of the offending female.

The Mandrill is one of the most striking members of the group as in addition to its size, at least a yard long from head to tail, it may weigh well over a hundred pounds. In the male the roots of the large canines cause the development of prominent ridges on each side of the head which are covered with folds of skin coloured a brilliant blue, whilst the nose is a bright scarlet. The bare skin on the buttocks is also coloured brilliant red and blue, with the result that no other known mammal presents a more spectacular pigmentation.

The Macaques include the common Rhesus Monkey: the famous Bandarlog described in Kipling's Jungle Books. These

animals, together with the sacred Langur, are common in Northern India, and can be seen in nearly every district playing on the roofs of houses, and shops containing anything edible have to be very carefully protected against their pilfering. Colonies of Rhesus Monkeys are usually to be seen in the London Zoo. In these colonies some individual, usually a male, becomes the leader of the group and keeps the others in order. Recently the leader of one of our colonies managed to escape, and his departure has been followed by a succession of fights among other members of the colony trying to become his successor.

One of the more intelligent members of the group is the Pig-tailed Monkey which is commonly used in S.E. Asia for collecting coconuts. Mr. Corner, when Assistant Director of Gardens in the Straits Settlements, trained some of these monkeys to collect botanical specimens from the tops of forest trees in Malaya. He mentions that only male monkeys can be used for this purpose and it takes about six months to train one to become an expert plant collector. The animals are kept on long leads and when given certain signals and words of command, climb to the tops of high trees and break off flowers and fruits. They are also trained to free specimens that get caught up in lower branches. Mr. Corner emphasised that before they would work satisfactorily it was essential to establish friendly terms with these monkeys, but also one had to see that they were thoroughly broken in to obey any commands. After seven or eight years, when they begin to know their own strength and ferocity, they are released in the forest as they are no longer safe to work.

The monkeys popularly known as Guenons are confined to Africa. They have acquired their popular French name from the habit of grimacing and showing their teeth when excited. Many different sub-species and local races of these Guenons can usually be seen in the Society's menagerie at Regent's Park. Probably the most familiar is the common Green Monkey, a West African species which has been liberated in the West Indies, where it has now become established. Other common species are the Mona of West Africa and the Vervet of S.E. Africa.

Among the other striking specimens often to be seen at Regent's Park, mention should be made of the popular Diana Monkey from West Africa, and the Patas, another West African species with a very striking reddish-brown coloration; also the curious White-nosed Guenons which look as though the animal had dipped its nose in flour. At present we have a group of the rather rare Brazza Monkeys in which both sexes carry a long white beard, giving them a curiously venerable appearance.

The Colobus or Guereza Monkeys include some of the most ornate species and are widespread throughout Africa. *Colobus polykomos* includes a large number of races grouped together under the popular name of King Colobus Monkeys, which show a very interesting range of colour variations. In the lowlands of

West Africa they are predominantly black, in the Kenya highlands large areas of the body are coloured white, and in the highest altitudes to which they extend on Mount Kenya there is a totally white race. The young seem to be predominantly white and gradually darken as they become adult. It is curious that the coloration of these various races always seems to harmonize with the natural surroundings at least as far as human eyes are concerned. Unfortunately these monkeys never do well in captivity and although from time to time examples may be seen in the collection at Regent's Park, they rarely survive for more than a few months. This is all the more surprising as in Nature some species are known to be able to withstand very varied climatic conditions. The long fur of these monkeys used to be in very great demand, and at the end of last century it was estimated that at least two hundred thousand were being killed annually. This wanton destruction has had the natural consequence and they are now comparatively uncommon.

Family *Simiidae*.

I now come to the Anthropoid Apes, the largest and most highly developed of the group which, together with man, are usually placed in one super-family, Hominoidea. Excluding man, the apes are distinguished by having the arms much longer than the legs, the hands never much shorter than the feet, and the thumb more freely jointed from the wrist than in the ordinary monkeys. In addition, there is never a trace of an external tail. In walking the palms of the hands are not applied to the ground, only the bent knuckles of the fingers, while the entire sole of the foot or its outer edge supports the hindquarters. Cheek pouches are also absent. This family includes the Gibbons, Orang-utan, Chimpanzee and Gorilla.

Gibbons are the smallest of the apes and the best adapted for life in trees. Their arms are long and slender and they have extremely long hands. Although spending most of its time in trees, when on the ground the Gibbon walks erect waving its long arms about in order to maintain its balance. They seem to be very sociable animals and in the jungle go about in bands. These are sometimes several dozen strong, dashing along through the tree tops and making great leaps from one branch to another of as much as twenty feet or more. Gibbons are confined to the forests of S.E. Asia and adjoining islands. Usually various species may be seen at Regent's Park, although as a rule they are rather delicate animals. The hardiest species is the Concolor Gibbon which ranges to considerable altitudes in its native Indo-China, and even in our British climate can be kept out of doors the whole year round. A pair of these Gibbons kept in a large cage in front of the Main Restaurant has bred twice in the last three years. In this species there is a marked difference in the colour of the sexes, the male being black and the female a kind of buff-grey. The young are born with the uniform buff coloration of the female, and

all darken after two or three years; whilst the male remains black, the female on reaching the age of seven years again acquires the buff coloration of the infant. The babies are carried by the mother for more than a year, although after a few months they are allowed a certain amount of freedom. The Siamang is one of the most striking members of the group as it possesses a very large laryngeal sac which is blown up when these animals make their characteristic cries. Incidentally, the voices, especially of the male Gibbons, have a tremendous carrying power and before the war their evening choir practice at the Zoo used to be an outstanding feature.

The Orang-utan is confined to the forests of Borneo and Sumatra, and there are many strange legends concerning the "man of the woods" which is the meaning of its name in Malaya. Orangs are covered with shaggy reddish coloured hair; the male is considerably larger than the female, reaching a height of 5ft. and a weight of up to 250lbs. Although in general structure it resembles the Gorilla and Chimpanzee, the Orang has much longer arms than either; also the fingers and thumb are stumpy. The legs are short and the feet long and narrow; the great toe is small and it may lack a nail. In certain local races the adult males develop very large expansions of the skin at the sides of the face, and in later life a large semi-circular laryngeal sac is developed which can be inflated with air. The brain, although relatively smaller, curiously enough is most like that of man. Orangs are rather solitary animals and the male lives either alone or with one female, accompanied by one or more offspring. They have the habit of building nests—large platform-like structures made out of crossed branches, usually about 25 to 40ft. above the ground. These nests are sometimes only used for a few hours but in other cases may be used for several nights in succession. They generally remain in their nests until the morning dew has cleared away.

The Zoological Society of London has rarely been without examples of this species, at any rate in recent years. Although generally considered to be less intelligent than the Chimpanzee and Gorilla, this impression is possibly only the result of their more retiring disposition. Many of them seem to have a mechanical bent and they certainly show great ingenuity in finding any weak spot in the wire of their cages.

The Chimpanzee is found only in Equatorial Africa. It spends most of its time in trees, its limbs being well fitted for climbing among the branches. Chimpanzees do better in captivity than all the other apes, often reaching a considerable age and not infrequently breeding. There is no question about their being the most generally popular examples of the apes as usually they have a somewhat human expression, lively habits, and high intelligence. The first ever to reach the London Zoo arrived at Bristol from the Gambia in 1835. At that time the coach service was still in use

and the Keeper sent down to collect the Chimpanzee had great difficulty in getting a passage for himself and "friend." His arrival in London created a tremendous sensation and was even the subject of a rhyme by Theodore Hook:—

"The folks in town are nearly wild
To go and see the monkey child
In the gardens of Zoology
Whose proper name is Chimpanzee.
To keep this baby free from hurt
He's dressed in a Cap and Guernsey shirt,
They've got him a nurse and he sits on her knee
And she calls him her Tommy Chimpanzee."

Much has been written on the behaviour of these apes for when young they are generally docile and can easily be trained to perform a number of actions superficially resembling those of human beings. They also show considerable intelligence, and have been shown to be capable of using elementary implements and also adopting such meaures as piling one box on top of another in order to reach food suspended out of reach. They are also said to be able to count at least up to five, and with diminishing accuracy, a few numbers higher. Trained Chimpanzees are fairly reliable until they reach puberty at seven or eight years of age, but when adult are liable to become dangerous and aggressive. The famous tea party at the London Zoo is made up of young animals ranging from thee to six years old, after which one can no longer depend on their good behaviour.

The Gorilla is by far the largest of the apes, adult males reaching a height of well over five feet and a weight exceeding six hundred pounds. The body is very massive with enormously strong arms. One Gorilla tested by a tug of war is said to have out-pulled a team of seventeen men. The head is large with heavy brow-ridges. The mouth is large and the canines greatly developed, especially in the male. They have a coat of black hair, often with a pronounced greyish tinge, especially in young individuals.

Gorillas are found in the forests of equatorial West Africa, especially in the Belgian Congo and the Cameroons, where they live in small family groups each led by an adult male. The Gorilla, like the Orang, constructs sleeping platforms in the trees, but it spends much of its time on the ground and runs on all fours. They always arouse very much interest, partly because of the fantastic stories about their behaviour in the wilds, for which Du Chaillu, the first European to see them alive, must be held partly responsible. He shot his first specimen only in 1860, and yet the following year a live Gorilla was actually exhibited (as a Chimpanzee!) in Wombwell's Menagerie. A drawing of this animal by J. Wolf is in the possession of the Society.

Until comparatively recently they rarely survived long in captivity, but with a better knowledge of their dietetic require-

ments and general hygiene, it is now possible to keep them healthy, and some individuals have lived more than twenty years in captivity. The oldest specimen in Britain, "Alfred" of the Bristol Zoo, died recently after having lived there for eighteen years, and was estimated to have been more than two years old on arrival.

The Zoological Society of London acquired its first Gorilla in 1887, but the first four specimens all died after a comparatively short time and it was decided not to keep any more. However, in 1920, a most famous tame Gorilla, "John Daniel," was shown by its owner, Miss Cunningham. This animal was very fond of human society and devoted to his mistress. He had been trained to sleep in a bed, eat at the table and generally behave like a normal human being.

Subsequently the Society exhibited "Mok" and "Moina", who came from the French Cameroons in 1932. These lived in the new Gorilla House and seemed to thrive until the war when they both died of some obscure wasting disease.

Our present Gorilla, "Guy", a young male also from the French Cameroons, is now being brought up by Mrs. Pinto Leite, who has voluntarily interested herself in the care of the young apes at the Zoo. He is most affectionate both with her and his keeper, and will play games, beating his chest with his fist when he gets excited. But already his strength is beginning to show and it is no longer practicable to give him as much freedom as he has enjoyed up to now. Gorillas are usually considered to be less intelligent than Chimpanzees, but they may be merely less co-operative with those who have studied their habits.

Finally, how are these higher apes related to man? In their appearance and general behaviour they show certain superficial resemblances, and are often referred to as "man's poor relations." But a more careful study shows that the higher apes are all very highly specialized and far removed from the human stock. Sir Arthur Keith some years ago made a careful analysis of man's anatomical characters and found they were shared among the Primates as follows:—With the Gorilla, man shares 87 characters; with the Chimpanzee 98 characters; with the Orang-utan 56 characters; with the Old World Monkey 53 characters; and with the New World Monkey 60 characters. It is curious that man is seen to show more characters in common with the New World Monkeys than with the Orang-utan. These results also support the now widely accepted view that man must have parted company with the other apes at a very early stage in the evolution of the Primates. This view has recently received very strong support by the famous discoveries in South Africa by Dr. Broom, and in East Africa by Dr. Leakey.

This week I had the privilege of seeing photographs of the skull of a Miocene ape which has just been sent to Professor Le Gros Clark at Oxford for study. This is a very well preserved

fossil of a monkey-like ape found by Dr. and Mrs. Leakey in September this year on Rusinga Island, Lake Victoria, Kenya.

Although a number of remains of fossil Miocene apes had been found previously, not only in Africa but elsewhere, these remains have usually been almost entirely confined to teeth and fragments of jaws, and this is the first occasion in which a skull of one of these early Primates has been obtained. The specimen belongs to a species, *Proconsul africanus,* defined by Dr. A. Tindell Hopwood on the basis of its dentition. The greater part of the facial skeleton has been preserved, almost intact on the right side, and also the frontal part of the brain case and the complete mandible. The teeth are excellently preserved, including the third molars which had already erupted and showed signs of wear. There are also various other parts of the skull.

It is evident from the general dimensions of this skull that *Proconsul africanus* was intermediate in size between a large Gibbon and a small Chimpanzee. It differed markedly from the Gorilla and Chimpanzee in the absence of the pronounced ridges above the orbits, and in general this region of the skull has a rather curiously human appearance. The contour of the nasal aperture resembles that of the Old World Monkeys rather than the anthropoid apes, and in some features the skull is more primitive than that of modern apes. In addition, the whole skull is very lightly constructed, with a remarkably thin cranial wall.

The deposits in which this specimen was found are judged, mainly on palæontological evidence, to be Early Miocene. Since the Miocene Period is generally believed to have begun about thirty-five million years ago, and to have ended fifteen million years ago, an estimate of twenty million years for the age of these remains is probably somewhat conservative.

A large number of other specimens of remains of fossil apes have been collected in these Kenya deposits during the past two years, and according to Professor Le Gros Clark demonstrate the existence, even in Early Miocene times, of a very great varity of primitive and generalised anthropoid apes, ranging from small gibbon-like forms to animals with the dimensions of a Gorilla. Arising out of this remarkable diversity, it is possible that certain types appeared, which, much later, evolved into the Hominidæ. They also provide important material for elucidating the relationship of the anthropoid apes to monkeys.

The detailed study of these remains combined with the recent important discoveries by Dr. Broom and his co-workers on the fossil ape-like creatures (Australopithecinæ) in South Africa, will certainly throw more light on the problem of the origin of all anthropoid apes, including that of the actual progenitors of the human family.

The Breccia of Redcliff, Wareham

By J. F. N. Green, B.A., F.G.S.

At Redcliff, by the river Frome, near Wareham, a remarkable breccia appears in the Lower Bagshot Sands. It is mentioned briefly in the Survey Memoir on the geology of the country around Dorchester, 1899, p. 26, and excellently described in the recent Memoir on the geology of the country around Weymouth, etc., 1947, p. 227.

> "The cliff is about 45 feet high. The lowest 25 feet "consist of bright red sand containing many thick bands of "a remarkable breccia, consisting of mottled white and red "loamy clay set at all angles in red sand. The fragments "are mainly from 1 to 3 inches in diameter, many smaller, "and they can be extracted whole."

No explanation of its origin has appeared, so far as I am aware.

In cross-section the commonest shape of the fragments is rectangular, one pair of sides being flat and several times the length of the other pair, which are often somewhat irregular. The prevailing colour is white, but there is often more or less red banding. The white is clay or silty clay; the red bands are of silt and fine sand with comparatively little clay; the surrounding red sand is an uneven mixture, mostly much coarser. A fair number of the fragments show some rounding.

A pecularity is the occurrence of curved fragments, sometimes in the shape of arcs, sometimes with one edge turned up. The banding bends with the fragment. The proportion is not great, perhaps one per cent., but they can always be found if looked for.

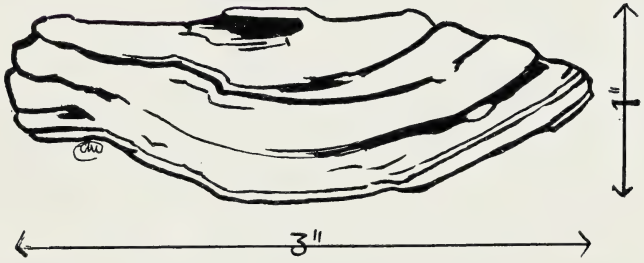
All these points are brought out in the beautiful photograph by the Geological Survey which accompanies this article, published by permission. The flat angular nature of fragments of clay enclosed in a sand matrix, and their occasional curvature are more particularly diagnostic of *desiccation breccia,* formed from the cracked crust on the surface of dried mud.

Such breccias have been extensively studied in America, where they are constantly forming in the more arid regions, but have attracted less attention in this country. The conditions for their formation have been stated by W. H. Norton (Journ. Geol. xxv, 1917, p. 160):

> "The conditions for desiccation are afforded where there "are long intervals between periodic floodings. . . . Where "the dried blocks of the mosaic or pieces of their edges are "assembled by the waves, the fragments may be irregu-"larly piled in rubble and should show some wear."

THE BRECCIA OF REDCLIFF, WAREHAM.
(By courtesy of the Geological Survey.)

BRITISH MUSEUM NATURAL HISTORY



FRAGMENT IN BRECCIA, IN THE POSSESSION OF THE SOCIETY.

(Drawn by Miss Whitaker.)

In this country the "intraformational breccias" not uncommon in limestones are often of this type. An example is the "False Cotham" of Sedbury, near Bristol. Curvature of fragments can often be seen on dried rain-pools, an excellent illustration being given by Holmes in his "Physical Geology" on page 85. It is, however, much more strongly marked in such pools than in the Redcliff breccia. E. M. Kindle has shown experimentally (Journ. Geol. xxv, 1917, p. 135) that the curvature is lessened by addition of salt, and it may be inferred that at Redcliff the water was at least brackish. This is confirmed by observations made in British Guiana by my son, F. R. H. Green, A.I.M.M. On seeing the Redcliff section he considered the banding to be evidence of tidal action. The influence of the tide extends far up the great rivers of Guiana and, under the tropical sun, makes a hard banded crust on mud-flats. Outgoing tide finds and breaks through weak points in this crust, cutting sharp gullies. This is what seems to have happened at Redcliff, where the breccia appears to occupy a gully. Miss Whitaker has kindly drawn the accompanying figure of a fragment in the Society's museum, which is probably part of such a crust. The thin-bedded character of the fragments of a desiccation breccia in course of formation on a tidal shore has been noted by C. D. Walcott (Bull. U.S. Geol. Surv. No. 134, 1896, p. 40).

The red coloration is evidently due to iron-bearing solutions percolating from above. The cliff is capped by ironstone, and the stain can be seen to be distributed along cracks. It was unable to penetrate the clay fragments, except along some coarser and more open bands.

Since the above account was written, I have seen a manuscript by Mr. St. J. Burton, dated 1938, which includes an explanation of the breccia by flooding and dessication.

Parallel Evolution

A Lecture given by Henry Bury, M.A., F.G.S., F.L.S.,
31st March, 1948.

We speak of Parallel Evolution, or as some prefer to call it, Convergent Evolution, when two or more animals, which are anatomically distinct, arrive at similarities of structure along different lines of descent. That, I think, is a fair definition, but, like most definitions, it is only intelligible to those who already have some knowledge of the subject. So I will give you one or two examples which will explain my meaning better than any definition.

You all know how closely a blindworm resembles a snake, although it is really not a snake at all, but a legless lizard. Its ancestors must at one time have had four legs, for all Vertebrates above the level of fishes have, or have had, two pairs of limbs. And the same must be true of the ancestors of snakes; but nearly all snakes have lost all trace of legs, while the blindworm retains internal rudiments of its hind limbs.

Here, then, we have a clear case of parallel evolution, where two animals, anatomically distinct, have arrived independently at similarities of structure, namely, a long flexible body without limbs.

Naturally, then, the question arises, how and why did this parallelism come about? And the obvious answer is that similarity of habit has led to similarity of structure. The ancestors of snakes found that, in forcing a passage through thick undergrowth, legs were more of a hindrance than a help; so legs were gradually eliminated by natural selection, and a long, thin body was evolved; and the lizard ancestor of the slowworm, adopting similar habits, independently evolved a similar structure.

Another familiar example is seen in the outward resemblance of Whales and Dolphins to fishes. The ancestors of the whales, being mammals, must have had four legs; yet they have got rid of the hind legs altogether, and the front legs are reduced to paddles. Here again similarity of habit seems to have led to similarity of structure, for to achieve success in aquatic life the whales had, like the fishes, to acquire a streamlined body, and a powerful tail fin. It is true that the whale's tail works up and down, while the fish's works from side to side; but that would not affect its mechanical efficiency, so the difference is unimportant. It is not however quite clear why there should be this difference, since mammals more often wag their tails from side to side than up and down. I can only suggest that the ancestors of the whales, in the early stages of evolution, frequently came ashore, as seals do; then a horizontal tail would slide easily over the ground, whereas a vertical one might be inconvenient.

Flying Squirrels.

In various parts of the world, animals are found which are

popularly known as Flying Squirrels, though none of them really fly, and only a few of them can rightly be classed as squirrels; and all that they really do is to glide from one tree to another. There are two distinct genera of true squirrels which do this. and each contains several species, so the habit of gliding, and the structure necessary for it, must have been evolved more than once by parallel evolution. In all of them a fold of skin extends along the flanks from the fore to the hind legs, and when the legs are extended, this fold forms a sort of parachute which helps to sustain them in the air so that they can glide from tree to tree for twenty yards or more.

Very similar in general form and habit is the "Flying Phalanger", but as it is a Marsupial it is of course very different in its anatomy. These again belong to several genera and species, and one of them is so small that it is called the Flying Mouse. They are only found in Australia and New Guinea.

Another glider, more efficient than any so far mentioned, is the Flying Lemur, though it is not really a Lemur at all, but one of the Insectivora. In this the fold of skin which forms the parachute begins at the throat, and extends out to the claws on both fore and hind limbs, and from the latter almost to the tip of the tail. It belongs to S.E. Asia, and Wallace saw one of them glide for seventy yards, while the loss of height in all that distance he estimated at only about 35-40 feet. I do not know much about gliding, but I fancy that a gliding angle of one in five or six is pretty good.

It is a curious fact that all these gliding animals are nocturnal; for one would have thought that the accurate judgment of distance would require a good light.

Here again we see that similar habits have led to similar structures in animals as widely distinct as Squirrels, Insectivores and Marsupials.

It is interesting to consider that true flight must, in some cases at least, have begun with gliding. Three classes of Vertebrates have achieved flight; in the Bat and the Pterodactyl the wing membrane has been greatly extended by the lengthening of the bones of the arm, and also of the fingers; and until this extension had proceeded far further than in the Squirrels, only gliding could have been possible. Birds went to work in a different way, for by the invention of feathers they were able to keep the hind limbs free for walking, instead of tying them to the fore limbs, as in the Bat, which is a very clumsy mover on the ground.

There has been some dispute as to whether Birds evolved flight by first running along the ground, and then jumping into the air for longer and longer distances; or whether they began by gliding from trees. It certainly looks as if the famous Archæopteryx never got beyond the stage of gliding, for its wings were very short, and there was no keel to the breast-bone such as we see in all existing birds that fly.

Prehensile Tails.

Many mammals that live in trees have prehensile tails; but their geographical distribution is most remarkable. By far the greater number of them are found in America, and especially South America, and very few of them go north of Mexico. There are some in Australia and the neighbouring islands; but in the vast continental area of Europe, Asia and Africa, I only know of two mammals with prehensile tails, and one of them does not live in trees.

In America the animals with this structure and habit belong to no less than five orders of mammals—Primates or Monkeys; Carnivora; Rodents; Edentates; and Marsupials. Many of the South American monkeys have prehensile tails, and this makes it very remarkable that not one of the Old World Monkeys, not even those with the longest tails, has ever acquired this structure.

Among Carnivores this feature is found in the little Kinkajou, which is often kept as a pet. Among Rodents it occurs in the rat-like Capromys of the West Indies, and in the South American Tree Porcupine (Cercolabes), which ranges as far north as Mexico.

In South and Central America we see it in the Two-Toed Anteater (Cyclothurus) which is an Edentate. It is found also in the Opossums, of which there are many species in North and South America.

Among the Marsupials of Australia a similar use of the tail is made by the tree-climbing Phalangers, including Cuscus, which lives in New Guinea, Moluccas, and Celebes.

In the Flying Lemur (Galeopithecus) the tail is said by Wallace to be prehensile; but you have seen what a short and peculiar tail it is; and at best it can only have a feeble grip. This animal lives in some of the islands off the South-East coast of Asia, and also in the Malay Peninsula; and it is very remarkable that, with one exception, it is the only mammal with a prehensile tail, so far as I know, in the whole of the Old World continents.

That one exception is our little Harvest Mouse, which is not arboreal, and only uses its tail in long grass.

It is easy to imagine how useful such tails must be to arboreal animals, and how easily they might be acquired; and that makes it all the more extraordinary that they should be almost entirely confined to America and Australia. So remarkable indeed is this distribution that I am tempted to suggest that it may have been influenced by imitation—that, for example, South American Monkeys watching the use of tails by Opossums, may have attempted to imitate them, and so have gradually acquired the same structure and habit. In saying this, I am not simply following Lamarck in supposing that the effects of use and disuse are inherited; but on strictly Darwinian lines, I am suggesting that, in each generation, those Monkeys which were most successful in using their tails would gain an advantage, which would be seized on by Natural

Selection. In connection with this, I may mention, though it is hardly evidential, that there are two genera of Tree Porcupines, Cercolabes which lives in the south, and Erethizon in Canada. The former has a prehensile tail, and lives in the midst of other animals similarly endowed; but Erethizon, which hardly, if at all, overlaps the territory of the Opossums, has not. The prehensile tails in Australia may have been independently acquired; but, according to one theory, there was formerly a land connection between South America and Australia, by which the Marsupials entered the latter country.

Jumping Rats, Etc.

We turn next to animals that do not live in trees, but on the ground; yet they do not run on four legs in the ordinary way: they jump instead.

Those of you who have been in Egypt are probably familiar with the Jerboa—a little rat-like animal with long and strong hind legs, short fore legs, and a long tail with a tuft of hair at the end of it. They live on the edge of the desert, feeding on bulbs and seeds, some of which they store up in their burrows for winter food. Animals of similar structure, and with the same habit of jumping, but belonging to many different species, are found in every desert in the world; and nearly all of them are small. Kangarooes, of course, are large, but they live under different conditions; and leaving Australia out for the present, the largest of these jumpers is the Cape hare, about the size of our British hares; all the rest are no bigger than rats, and often smaller.

Moreover, with one exception, all are Rodents—that exception being the South African Elephant Shrews, which belong to the Insectivora; and they are the only ones which are diurnal; all the Rodents are nocturnal. These Rodents belong to no less than twelve genera, and many, if not all, must have developed the jumping habit independently.

But to return to Australia: we find in the deserts a tiny jumping animal, no bigger than a mouse, which, like nearly all the mammals of Australia, is a Marsupial, and is commonly called the Kangaroo Rat. This is a splendid example of parallel evolution, for the Rodents and Marsupials are anatomically very far apart; but the remarkable thing is that in the same deserts as this Kangaroo Rat is another jumping animal (Conilurus) which outwardly resembles it, but is a true Rodent. How it got to Australia we have no idea. The only other placental mammals in that country are the wild dog, which was probably brought in by man, and one or two true rats, which may have come in the same way: but this Conilurus is not found in South-east Asia, so we have no idea when or how it came.

It is interesting to note that natural selection has acted in opposite directions on the front and hind limbs, for while the hind legs were growing longer and stronger, the front legs were

dwindling away to about half their former size. It is obvious that this structure and habit must have some special value for desert animals, but it is not very clear where the advantage lies. Possibly jumping is a more rapid mode of progress than running; on that I have no information: but a sudden jump of several yards might upset an enemy which hunted by scent; while in the dusk such sudden movements might be puzzling to one hunting by sight: yet we find the same habit in the Elephant Shrew which feeds by day. It is easy to see that this form of progression is only suited to open spaces; it would be useless in woods with thick undergrowth; and only large animals like Kangaroos could adopt it in long grass. That perhaps accounts for the habit being almost entirely confined to deserts.

Racquet Tails.

All the cases of parallel evolution so far considered are capable of being explained on the principle that similar habits require similar structure, and so, through countless generations, variations favourable to those habits have been selected. But I shall now bring forward a case in which the utility of the structures is by no means obvious.

In the Malay Archipelago, Wallace found several species of Kingfishers belonging to the genus Tanysiptera which differ from all other Kingfishers in the world in having the two central feathers of the tail very much elongated, and ending in racquet-like expansions. They do not dive, like our kingfisher, into the water, where these feathers would be very inconvenient, but they feed on the shore; even so, however, it is difficult to suppose that these feathers can be of any use to them. But although these birds are unique among Kingfishers, there are many others that exhibit this curious structure. A little further north, in the Philippines, there is a parrot with similar tail-feathers, and it is absolutely unique among parrots in this respect.

In the island of Aru, close to New Guinea, we get the King Bird of Paradise, a lovely red bird with a most remarkable tail, of which Wallace says: "The two middle feathers of the tail are in the form of slender wires about five inches in length, which diverge in a beautiful double curve. About half an inch of the end of this wire is webbed on the outer side only and coloured a fine metallic green, and being curled spirally inwards form a pair of glittering buttons, hanging five inches below the body, and the same distance apart." He adds that such feathers are found in no other bird in the world.

In the Malay Peninsula we find several birds called Drongo Shrikes, which have tail feathers comparable with those of the Kingfishers, except that the terminal expansion is more that of an oar than of a racquet. There are several species, and even genera of these birds. The only other bird with such a tail that I know of in the Old World is a Roller.

We turn next to South America, where we find the Motmots, which have two long feathers separated from the rest of the tail by short bare shafts. A racquet-like ending is thus produced, but the remarkable thing is that these bare shafts are not natural—they result from the biting away of the barbs by the birds themselves. In the Racquet-tailed Humming Birds the bare shafts are quite natural, and are as long as they are in the King Bird of Paradise.

What can be the meaning of this extraordinary feature being repeated in so many birds, widely separately both structurally and geographically? It seems impossible to suppose that it is of any direct use, or that it arises from similar habits. But having regard to the fact that it is produced artificially by the Motmots, and that in at least two other birds (King Bird of Paradise and Humming Bird) it is confined to the male, we may suppose that it is in some way connected with courtship and display. But the evolution of all the features assigned by Darwin to Sexual Selection remains very obscure.

Celebes.

So far all the cases of parallel evolution which we have considered have been concerned with vertebrate animals. Now we will turn our attention to Insects.

When A. R. Wallace visited the island of Celebes he found that the wings of many of the butterflies differed both in size and shape from those of their nearest allies in the neighbouring islands. This was true not only of species belonging to the same genus, but of a large number of species belonging to at least three distinct families. Wallace (Malay Archipelago, p. 281), gives two pictures, the outside figure represents the wing of a Celebes butterfly, and the inner one that of the nearest allied species in the neighbouring islands. In each case, the Celebes wing is larger and more pointed than the other. In the first figure the small wing belongs to a species which hanges from India to New Guinea and Australia; while in the second case the owner of the small wing is found in all the islands to the west.

Wallace naturally sought for an explanation of this extraordinary phenomenen, for as he says: "It is altogether a new thing for a whole set of species in one country to differ in exactly the same way from the corresponding sets in the surrounding countries:" and he evolved the following hypothesis. From the analogy of birds he inferred that these pointed wings denoted swifter flight, and he suggested that they might have been evolved as a means of escape at a time when insectivorous birds were more abundant than they are now. It is not surprising that Wallace, as one of the discoverers of natural selection, should endeavour to explain such phenomena in terms of that theory; but he does not make out at all a strong case. The only evidence in its favour which he adduces is the fact that these pointed wings are absent from the small and dull-coloured butterflies, as well as

from a few very strong fliers; but against this we may set the fact that Wallace himself did not notice any increased speed of flight—he only inferred it from birds. Yet I doubt whether this inference is valid. In the only birds that I have examined, the pointed wings are longer in proportion to their breadth than the rounded ones; but that is certainly not the case with these butterfly wings—rather the other way in fact. Wallace frankly admits that "it is not at all clear what effect the peculiar curvature of the wings has in modifying flight." He admits too that at present there is no abundance of insectivorous birds—he only infers that there must have been at one time. But I may add that although birds undoubtedly eat butterflies when they find them on the ground, yet hawking them on the wing is exceptional. Nowhere else in the world has persecution by birds led to such results, so the persecution must have been exceptionally servere in Celebes, and yet it did not affect any of the adjoining islands!

It does not seem to me therefore that Wallace's hypothesis is at all probable; and I prefer to regard this as another case of parallel evolution for which we cannot properly account.

Hawaiian Wasps.

My next problem concerns certain insects in the Sandwich Isles, or Hawaiian Islands, which lie in the middle of the Pacific, two thousand miles from America, and three thousand miles from Japan; and as there is no evidence that they ever joined up with either continent, it is not surprising that most of their species of insect are peculiar to these islands.

The insects with which I am now concerned are Solitary Wasps, especially of the genus Odynerus. This is a world-wide genus—we have several species in this country—and it shows much variation in colour both of body and wings. Very commonly the body has yellow bands across it; but the bands may be white or red, or the whole body may be black. The wings may be quite clear, but often they are more or less brown, and not uncommonly they are black, with iridescent reflections of blue or purple.

There are nearly a hundred species of Odynerus in these Hawaiian Islands, and their colour patterns are very curiously distributed. If we go to Kauai, at the north-west end of the chain of islands, we find a large number of species, which are, almost without exception, conspicuously banded with yellow and white; and a totally distinct family, called Crabro, also has yellow bands. If however we go next to Hawaii, at the other end of the chain, we find that almost every species has a black body; and this is true, not only of Odynerus, but of several species of Crabro, of several Solitary Bees, and some Ichneumons; in fact almost all the insects of the island have, in effect, gone into mourning.

Among the other islands, Molotai and Maui have an unusual number of red stripes; while in Oahu we have nearly all possible variations of Odynerus. The bodies may be banded with yellow, white or red, or they may be wholly black; and the wings may

be clear, or brown, or black. It is most remarkable how each island seems to have its own colour pattern. There is a species in Hawaii with a black body; but what is almost the same species has red bands in Molotai, and white bands in Kauai.

I could give further details, but we have enough now to justify us in asking the question, what can be the cause of this most remarkable distribution in these islands? The late Professor Poulton regarded the dominance of black coloration in Hawaii as an example of what is called Müllerian mimicry. It is assumed that all these wasps and bees are unpalatable to birds, either because of their stings or for other reasons; and in that case protection from attack may be gained by the assumption of warning colouration. That is probably why we have so many wasp-like insects (beetles, flies and others) in this country. They profit from their resemblance to wasps. But the young birds have to learn by experience; and therefore, when persecution is very severe, it may be advantageous for all the insects of that region to take on the same colour-pattern: the birds then only have to learn one warning pattern instead of several. That is what is meant by Müllerian mimicry; and it is supposed that, under exceptionally severe persecution, almost all the wasps and bees of Hawaii assumed the same funereal pattern.

That is Poulton's theory, but it seems to me profoundly unsatisfactory. Admittedly there is no persecution now, but is has to be assumed, for the sake of the theory, that at one time it was very severe. That assumption can neither be proved nor disproved; we might be more ready to accept it if it met all the facts; but it does not. Kauai has yellow bands on both Odynernus and Crabro, and as these are considered to form a successful warning-pattern all over the world, why were they ever given up in Hawaii? And what about Oahu? Why do we find there the greatest possible variety of colour both in body and wings? Are we seriously asked to believe that there was at one time such serious persecution that it kept Hawaii black, and Kauai yellow; and yet such peaceful conditions in Oahu that it did not matter what colour patterns were used? It seems to me then, that Poulton's theory rests on insufficient evidence, and that no satisfactory explanation of all this parallel evolution has yet been found.

Mimicry.

I want to say a few words about Mimicry, as the term is sometimes misapplied. In true Mimicry one animal (usually a Butterfly) resembles another in such a way that one of them gains an advantage from the resemblance; one is distasteful to birds, and is called the "model"; the other is palatable, and would be eaten, if the birds recognised it; but owing to its resemblance to the model this "mimic" escapes. Besides resemblance, however, there are two other essentials in mimicry—first, the animals must live in the same district, and secondly, the models must be much more numerous than the mimics.

It not infrequently happens, however, that two animals resemble one another, although they live in different countries. There are, for example, two butterflies, so much alike that, if they lived in the same country, mimicry would be suspected; but as one of them lives in the Himalayas, and the other in South America, no such explanation is possible: it is a case of parallel evolution without apparent cause. I could give several instances of such "false mimicry", as we may call it, not only among butterflies, but among birds and other animals; but as time presses, I will content myself with one case in which mimicry was actually assumed, until the facts were more fully known.

In Mexico there are a number of "Coral Snakes," brilliantly coloured in black, red and yellow. Most of them are harmless, but one, called Elaps, is extremely poisonous. For some time this was supposed to be a case of mimicry. Elaps was supposed to be protected by its poisonous qualities, and the harmless snakes profited by their resemblance. But on closer examination it was found that the so-called mimics ranged over a far wider territory, and were much more numerous than the "model". Moreover Elaps hides itself all day under rocks and bushes, and only comes out at night when its colouring is no longer conspicuous: while it is greedily eaten by peccaries, turkeys and iguanas. So the brilliant colours seem to be of no use either to Elaps or its imitators.

Social Insects.

Many striking examples of parallel evolution occur among insects, and perhaps the best-known case is that of the Social Hymenoptera, i.e. the Ants, Bees, and Wasps. All of them produce large and highly organised communities, in which practically all the domestic work is done, not by the males or females, but by the workers, which are sterile females. Each of the three families must have evolved this social organisation independently, so that this is a clear case of parallel evolution.

But since these families are very closely allied to one another, this evolution on similar lines is not perhaps very surprising. What is surprising however is the remarkable amount of parallelism between the Ants and the so-called "White Ants" or Termites, for the latter belong to a totally different order of insects, and are about as far removed anatomically from the ants as Monkeys are from Kangaroos. Owing to this difference in anatomy, they are not very much alike in body, but the parallelism shows itself more in the details of their lives. These Termites are the only insects, apart from the Hymenoptera, which form large and highly organised colonies, and in them, as in the ants, there are three types of individuals—males, females, and workers. The males and females are winged, but they only make a single flight, and then the wings break off. The workers are never winged, and are sterile. In both cases too the Queen, after her one flight, digs a hole in the ground, in which she rears the first

brood of young, which are all workers; and as soon as they are grown up, she devotes herself exclusively to egg-laying, while all the domestic work—looking after the eggs and young, obtaining food, and enlarging the nest—is done by the workers.

Here however I must mention a difference. In the ants the males die shortly after their flight; but in the termites one male assists the queen in digging the first hole, and is allowed to live with her in the nest; and moreover the workers are sterile males as well as females. In both insects the nest is usually underground to begin with, and consists of an irregular network of corridors and chambers: but in many cases the excavated earth is piled up above ground, and may form ant-hills of great size. But in both cases most of the work of the community is carried on underground and in darkness

In our English ants all the workers are alike, but in many foreign ants, as well as termites, what are called "soldiers" are produced, whose business it is to protect the ordinary workers. They have large heads, and very powerful jaws.

In some ants too, and some termites, the ordinary workers march out in large columns, and the soldiers guard the flanks of the column. The workers climb up trees, and cut off pieces of leaves, which they carry back above their heads like parasols or banners. These leaves are cut up in the nest, and deposited so as to form a sort of compost on which fungi grow; and these fungi, which are carefully tended and manured, serve as food.

Yet another remarkable similarity lies in the fact that both ants and termites keep domestic animals in their nests. These are usually insects, especially beetles, which secrete a honey-like liquid of which the ants and termites are extremely fond; and it does not seem to trouble them that some of these domestic animals feed on the larvæ of their hosts.

In this cultivation of plants for food and care of domestic animals, the ants and termites differ from all other animals in the world except man. Many people, including Solomon, have held that we are, in some respects, inferior to ants. That may be so; but at least we do not stand calmly by while our domestic animals feed on our children!

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Vitalism and Chemical Synthesis

By Herbert E. Clarke, M.A., B.Sc., F.R.I.C.

Author's abstract of a lecture delivered on Dec. 20th, 1947.

1. The Approach to Vitalism:

The Concise Oxford Dictionary defines Vitalism briefly, as "the doctrine that life originates in a vital principle distinct from chemical and other physical forces." Thus there are at least three possible approaches to Vitalism, with the partisans of any one of these strongly opposed by the adherents of the other two. For example, changes in form and function, as manifested by "organised" nature, have for some religious implications, the ethical quality of which ranges all the way up from primitive animism, totemism and pantheism, to modern cults, standing for control by an omniscient deity, and sometimes also with man conceived as a co-worker and interpreter of a divine creator.

In direct antithesis to this we have the mechanistic interpretation, according to which vital phenomena are judged to be purely physical and chemical reactions of an imperfectly understood kind. By the very numerous partisans of this thesis no limit is set to possible future achievements in chemical synthesis, operated with the materials lying on the borderline between the animate and the inanimate.

A middle position is assumed by metaphysics, many followers of which, while they do not agree that there is a divine direction of material and emotional factors in nature and man, do recognise the existence of a region of phenomena outside the capacity of purely mechanical and chemical agents either to initiate or to direct.

Now, one may feel intuitively that some supreme intellect will eventually reconcile these divergent opinions, which may not be incompatible after all. My present purpose is simply to consider the fasinating borderline between chemistry and biology, and I propose to confine my attention to the lowliest living forms, as those most likely to furnish hints about the way in which matter may become the medium or vehicle of life, while still in near relationship to what is universally acknowledged to be inanimate.

2. "Living" and "Non-Living" Matter:

The vitalist hypothesis requires that, whatever the scale of development of an organism, a special vital energy is required, failing which, or upon the disappearance of which, matter is inanimate, or undergoes the change from "life" to "death."

It will be just as well that we avoid at the start the error of some biologists (who surely run in closed circles) when they judge a cell to be "alive" or "dead" purely on the basis of the *empirical standard* which they themselves have already set up, viz. that a "living" cell grows and reproduces itself, while a "dead" cell does not. It is dangerously easy from such a criterion

to reach the conclusion that an anabolic change is a phenomenen of life, and a katabolic change one of death. This of course would be absurd, for animals in general break down the very complex constituents of their food *before* they proceed to build them up again into the special protein constituents of their own protoplasm. We must, I think, go further and assign to "living" material, not merely the criteria of growth and reproduction, but also (on the part of organisms at least) that of selectivity of form, ostensibly designed for the special advantage of the unit. We see this characteristic of life, at its lowest level in the suitable proportioning and scaling of parts, and at a higher level in the evolution of differentiated parts and organs. It is to be noted that we are here introducing, as essential to "life," not merely the notion of growth, but also that of a directive or purpose in growth, and while this character appears to be fundamental, it also appears, to the best of our experience, to distinguish chemical and physical from vital types of synthesis. Organic chemistry has, indeed, no hopes of becoming life-creative, but this is not to be read as a wholesale surrender to traditional vitalism, seeing that many of the characteristics once held to be inseparable from life have been, or undoubtedly soon will be, brought within laboratory control, for these characteristics have been proved to arise in nothing more than the high chemical reactivity of the compounds, and groups of compounds, concerned in so-called vital changes.

3. **Energy Build-up in Complex Molecules:**

Two atoms (of the same or of different elements) may exchange or transfer the mobile electrons of their outer "shells" (or "energy levels") in accordance with a tendency for atoms either to complete their incomplete "shells," or to dispense with the latter altogether. Usually the outer "shell" of an atom accommodates eight electrons at saturation, but compounds are very often built up from atoms without a proportion of electron gaps being filled up. Wherever such gaps remain, regions of potential chemical energy remain. It is probably because the massive molecules (many with hundreds, or even thousands of atoms) found in the cells of plants and animals, are built up out of atoms with many of these electron (or "valency") gaps, that the aggregates are generally so unstable and chemically reactive. The build-up culminates in what we call "protoplasm," and it is apparent that the manifold reactions of which this complex material is capable, would be impossible in a substance of simpler constitution where these regions of unsatisfied energy (or "valency", in chemical phraseology) were not available.

Protoplasm is synthesised in nature by catalytic reactions (see below) at temperatures which are relatively low, in the usual chemical sense, and by repeated absorptions of energy which are not high in intensity, in the physical sense, but which in the aggregate are great in amount, largely because they go on for so prolonged a period. In the course of evolution it is fair to suppose that "protoplasm" itself grew to be a medium admirably suited

for the production of certain catalytic and other agents; these were necessary for "touching off" main reactions, that is to say, reactions used and specially favoured by individual organisms, or parts of organisms, in their own peculiar ways of life. It is interesting to note that fundamentally many of these reactions are, according to Hinshelwood, simple chain reactions, often reversible in character. Thus it transpires that when energy is needed for accomplishing a synthetic change, it is frequently supplied from coincidental reactions in which the necessary amount of energy is evolved. For example, in animal metabolism material is supplied for the energy-yielding stages of an elaborate synthesis, by the animal's use of ready-made complexes built up by plants, which in their turn have drawn freely on solar radiation absorbed, with the help of chlorophyll, in their green parts. The gradual ascent to protoplasmic levels of complexity is achieved in nature with a marvellous economy and application of resources. Thus the proteins are chiefly reached by a process of repeated polymerising condensations from the amino-acids, subtle advantages being taken of the fact that amino-acids have at opposite ends of their molecules basic (positive) and acidic (negative) groupings, which endow these compounds with polar characters and enable them to join end-to-end in chains, which may grow till they hold hundreds of the orginal units together. Thus for example, two glycine molecules condense together to form a dipeptide, and this in like manner condenses with another identical dipeptide molecule to form a polypeptide. And so growth goes on, to still more massive molecules, until a protein complex is reached. The organic chemist has freely initiated this principle in his synthetic work; nylon is only one example, where natural silk has been simulated in the laboratory by reactions perhaps resembling closely those occurring in the body of the silk-worm.

4. **Comparison of Chemical with Vital Synthesis:**

Some 120 years ago the German chemist Wöhler prepared urea, a typical "vital" product of the higher animals, from potassium cyanide, ammonium sulphate and lead oxide, all inorganic substances. Since his time urea has been synthesised from ammonia, water and carbon dioxide, all of which compounds may be prepared from their constituent elements. What in Wöhler's day seemed quite revolutionary, the laboratory preparation of animal and vegetable products, is to us today a commonplace. We take for granted synthetic dyes, drugs, perfumes, sugars, resins, rubber, and so on, once only obtainable from plants. This is not to say that although the laboratory products are identical with nature's, the synthetic technique is necessarily similar in the two cases. The materials concerned in nature's syntheses are as a rule complex bodies only capable of continued existence between narrow limits of temperature. Externally supplied heat is either destructive, or at best only of secondary importance in plant and animal syntheses; when external energy is utilised, as it is in

plants, it takes the form of light rather than of heat. On the contrary, chemical syntheses generally make use of reactions promoted by the application of heat. Only in the extensive use of polymerisations, and in the application of catalytic agents, do "vital" and chemical syntheses display any close parallelism. The greater delicacy of "vital" processes is also shown in the fact that they are operated with materials which are destroyed not by heat only, but also by the shorter-waved ultra-violet, X and gamma types of radiation; chorophyll reacts vigorously to only a small portion (the red and orange) of the visible spectrum.

5. Catalysis and Enzyme Action:

The great majority of chemical changes may be accelerated or retarded by the mere addition of some substance, which is found to remain at the end of the process in virtually unaltered amount. In most instances a very small quantity of such "catalyst" is sufficient to effect a large scale chemical change. The composition of effective catalytic agents shows every possible variety, from certain of the elements themselves, up to compounds of extreme molecular complexity, like the enzymes. The precise mechanism of catalysis in some forms is still a matter for research, but it is already possible for theorists to avail themselves of certain easily understood principles of molecular structure and to find in what have been styled "lock-and-key" and "surface adsorption" mechanisms at least some of the controlling factors in catalytic action.

Organic chemists have formed a substantial picture of the way in which the atoms of quite elaborate organic molecules seem to be arranged and associated with one another in three-dimensional structures. This gives every compound a definite contour and affects or limits its chemical approach to other compounds, in a way analogous to the effective fit of a key into its own, but not into another, lock. In other words, the catalyst and the compound it affects, are able to join together by virtue of their mutually convenient shapes, and the addition product then embodies, or acquires by absorption, a supply of energy which is adequate for allowing a large-scale chemical transformation to proceed; for which we have the analogy of the fitted key turning in the lock by a twist of the fingers. It is probably by some such mechanism that enzymes, vitamins and hormones are enabled to promote their own *specific and characteristic* reactions, in the metabolism of plants and animals. I have already indicated that the chemical systems there concerned are possessed of a large store of energy, which is ready for re-arrangement and re-distribution so soon as the right kind of association between parts is made possible. The dual character of biological fertilisation may not unreasonably have its chemical foundation in a catalytic process of this kind.

Hardly less important in catalysis are the effects arising out of the unbalanced forces which are always found at the atoms composing the surface layers of solid particles. Space will not

allow me to show how the catalytic activity of many bodies is related to the great development of the surface which they present to the substances they influence; but as colloidal systems are characterised by outstanding surface development it is not surprising that a large proportion of active catalysts are colloidal substances. This surface activity is often found to be concentrated at definite points, a matter of the greatest biochemical significance which also cannot be adequately dealt with here.

It can scarcely be questioned that chemical activity in living cells is enhanced by the developed surface areas of the granules which are seen floating in the cytoplasm. And it only remains to remark that in the many present-day industrial applications of catalytic aids, it is again most frequently the surface factor of which chemists have taken advantage.

6. **The Vital Directive:**

Such elaborate and ingenious apparatus as the so-called "electronic brain" (in which operations are mechanically produced simulating the operations of a rational organism, e.g. a right choice as between two or more alternatives), serve to remind us that the common phenomena of life must necessarily be manifested through the ordinary material channels of physics and chemistry. But the *initiative* is, in my view, outside the scope of the physical sciences. Even in the metabolism of the lowest organisms countless evidences of this could be adduced. Thus *Bacillus coli* is readily killed by carbolic acid, yet if this organism is grown in a culture containing traces of carbolic acid, it develops a steadily increasing tolerance to this poison and becomes able to grow and multiply in its presence. Many bacteria, again, are found to alter their strain, becoming, for example, pathogenic when they are introduced to a suitable host. Further, when certain pathogenic bacteria are attacked by their enemies, the phagocytes, they proceed spontaneously to enclose themselves in a sheath, of a polysaccharide composition, which the phagocytes (for a time at least) are unable to break down, because they lack the particular enzyme necessary for that attack. Even the encystment resorted to by the spores of fungi to combat excessive desiccation, is a striking enough example of the directive characteristic of living matter. "Nature" (to personify the urge behind evolution) expended superlative chemical skill in elaborating protoplasm, but clearly this synthesis was not an end in itself; rather we must conclude that protoplasm was designed to be the medium through which individuality and differentiation should at length be displayed.

7. **Regarding Viruses:**

From the chemical aspect viruses are by many considered to consist of protein molecules held in a geometrical symmetry by uniformly spaced inorganic elements. They are all very reactive substances and they vary widely in complexity, the simplest being definitely unorganised, though, no doubt, opinion is divided as to the nature of the more complex viruses, which, however, never

seem to reproduce themselves away from direct contact with material acknowledged to be living. The smallest viruses (at, say, 20 millionths of a millimetre) do not differ in size from that of four or five molecules of soluble starch set end to end, and they cannot therefore be organically differentiated. Nevertheless, by attaching themselves to living protoplasm these virus groupings can instigate all the activity that is necessary for their own rapid multiplication, at the expense of the "host." Here we have a close parallel to the parasitism of the bacteria, and there is justification for interpreting the viruses, not as self-contained living organisms, but as fragments carrying enzyme characters. Their active enzyme may be presumed to be specially fitted for attacking protoplasm, with the formation of a further quantity of the *same* active enzyme. Such " chain reactions " (another example is found in the development of the explosion of an atomic bomb) proceed with prodigious acceleration, and may often be started-off with an extremely minute supply of the activating agent. Despite its stupendous activity while provided with living protoplasm, such a virus as that operating in an animal stricken with epizootic (foot and mouth) disease, loses its power if separated from its living host, and rapidly decomposes. This behaviour recalls the inanimate chemistry of the laboratory rather than a living cell engaged in manifesting vital adaptation. It also suggests that *organised* protoplasm may have been developed or created *before* the viruses appeared in their present-day character. If, on the other hand, viruses are viewed as being in the direct line of approach from non-living to living matter, the present active strains at least, do not lend colour to such a hypothesis.

8. **The Origin of Life:**

J. B. S. Haldane has built, on the foundation of researches by E. C. C. Baly (which, however, ought not to bear so weighty a superstructure), a theory* of the origin of protoplasm from water, ammonia and carbon dioxide, made to react together under the stimulus of the sun's ultra-violet radiation, passing for long ages through a primitive atmosphere supposed to be relatively free from oxygen (which absorbs the ultra-violet). It must, however, be objected that it is not ultra-violet radiation which is used for their synthetic needs by plants, indeed protoplasm is readily destroyed by short-wave radiation. Haldane supposes that, a virus stage having been reached, matters remained static for ages, until suddenly the virus came alive, under some fortuitous set of favouring conditions. His thorough-going materialism is also well illustrated in the parallels he tries to draw between crystallisation and polymerisation in chemical practice, on the one hand, and the growth of viruses and doubling of genes in the nuclii of living cells, on the other. The view is advanced that the first evidence of variation may have appeared in a symbiosis between

* " The Inequality of Man, and other Essays," Pelican Book No. A12.

two or more differing strains of virus. Pasteur's authority is accepted, so leading on to the assumption that, inasmuch as the coming of life is such a mysterious fact, it probably only happened once and in only one group of molecules. But, surely, as many "mysterious" things constantly recur, the sudden appearance of life at a number of different places and times would be no more difficult to account for than its appearance as one unique miracle in the world's history.

Pasteur, more than any other worker, is responsible for the doctrine, now almost as universally accepted as that of the rotundity of the earth, that spontaneous generation has never been proved to occur, and that all life must proceed from parent life. Pasteur's experimental work was brilliantly performed, and his *results* have never been successfully challenged. These experimental results, however, do not always sustain the *interpretations* he put upon them. He was in error, for example, in supposing that enzymes, or ferments, were necessarily living agents; and, again, it can readily be shown that his consistent failures to obtain evidence of spontaneous generation could have been predicted from the simple circumstance that, in preparing his strictly sterile media, he frequently destroyed the very substances which must have been the real prerequisites for any manifestation or development of life.

But a final judgment on Pasteur's claims rests upon the sort of answers we give to two questions about this medium of life, protoplasm:—(1) Can we hope that protoplasm may at some future time be prepared in a laboratory, from materials which, according to acceptable criteria of the "living," are inanimate? If the answer is *yes*, then (2) Is it possible for such a synthesised protoplasm spontaneously to come "alive," assuming that we supply all the necessary favourable conditions? Pasteur would answer:—No, not in the absence of parent living cells. He might be right, but it is by no means certain that he would be right. A slavish adherence to his doctrines has indeed sometimes forced on the scientific world theories for the solution of outstanding biological problems which I think are so ingenious as to smack of unreality; for example, theories accounting for the puzzling geographical distribution of animals and plants over the continents of the earth. An opponent of Pasteurism would be free to say that the problem was largely eased if the "spark of life" had been struck, not at one unique time and place, but on more than one occasion—perhaps indeed frequently—in the course of these last thousand million years. One may, very likely, be temperamentally sympathetic towards Pasteur and his great school, or at variance with them, according to the nature of one's fundamental thoughts and speculations on life itself. In the long run we find we cannot dismiss the religious and spiritual aspects of this greatest of human problems; those aspects are truly relevant, but they are too profound for our consideration here.

Lantern Slides

The Society has more than 7,000 lantern slides available for the use of members. Application for the use of slides should be made to Mr. F. Williamson, who is in charge of slides, or to the Chairman of the appropriate Section.

	No. of Slides
ARCHÆOLOGY.	
Prehistory ...	220
Roman Britain ...	65
Medieval Buildings	36
Bells of all kinds ...	76
Carved Ivories ...	41
Scratch Dials ...	16
Smoking Pipes ...	80
Total	534
ASTRONOMY ...	480
BOTANY.	
Cryptogams ...	46
Conifers	66
Phanerogams ...	309
do. diagrams ...	90
Trees	85
Tropical Plants ...	177
Medicinal Plants ...	55
Economic Plants ...	190
Landscapes and Gardens ...	30
Diatoms	52
Total	1100
GEOGRAPHY. British Isles	
Bournemouth ...	145
Christchurch ...	49
Poole	37
Hampshire ...	97
Dorset	258
Somerset	34
Wiltshire	28
Cornwall	274
Scilly Isles	34
Yorkshire	88

Geography—*cont.*	No. of Slides
Various Counties ...	55
Wales	32
Scotland	19
Ireland	16
Channel Isles ...	9
Total	1175
GEOGRAPHY. Foreign.	
Maps (general) ...	50
Algeria and Tunisia	58
Balkans	18
Canary Islands ...	33
Ceylon	14
Egypt	365
Europe (general) ...	50
Florida	39
Formosa	22
Germany, Munich	80
Greece, Crete and Mycenae ...	78
India	579
Italy (general) ...	164
do. Pompeii 58, Sicily 21 ...	79
do. Rome ...	250
do. Venice ...	185
Japan	82
Malaya	38
Malta	38
Newfoundland ...	21
New Zealand ...	53
Russia	34
Switzerland ...	63
Turkey	44
West Indies ...	107
Total	2544

	No. of Slides
GEOLOGY.	
Landscapes & Cliffs, British	124
do. Foreign ...	96
Diagrams, Sections, Maps	81
Caves and Caverns	18
Glaciers and Glacial Action	24
Volcanoes and Volcanic Action ...	33
Fossils—Zoological	159
do. —Botanical	20
Meteorites ...	29
Total	584

	No. of Slides
PHYSICS.	
Life and Works of Lord Kelvin ...	60
ZOOLOGY.	
Entomology ...	146
Galls and Gall-Flies	107
House Cricket ...	51
Birds—British ...	267
do. —Foreign ...	109
Dogs	89
General	52
Total	821

Obituary Notices

PROFESSOR M. C. POTTER.

The Rev. Prof. Michael Cressé Potter was born on Sept. 7th, 1858, at Corby, Warwickshire, where his father was rector. By his death, the Society loses one of its oldest and most distinguished members and past Presidents. We are indebted to "The Times" for the following facts concerning his education and career.

Educated first at St. Edward's School, Oxford, he then went to Perse School, Cambridge, and thence, in 1878, to St. Peter's College, Cambridge. He took the Natural History Tripos in 1881, and his B.A. the same year. He next worked for the Mathematical Tripos, being senior optime in 1883. He then turned to botanical studies in earnest, and from 1884 to 1891 worked at Cambridge as assistant to Prof. C. C. Babington in the incorporation of specimens and the arrangement of the herbarium. He had two breaks, for he was awarded a Wort's travelling scholarship in 1886 to go to Portugal, and again in 1888-89 to study the tropical flora of Ceylon.

In 1889 the University of Durham expanded by founding colleges of Science and Medicine at Newcastle, and included a department of botany. Mr. Potter was appointed head of this at Armstrong College, and later, when a Chair was founded, became the first Professor, remaining at Newcastle until his retirement in 1925, when he became emeritus.

Prof. Potter is best known to students by his translation of Warming's "Handbook of Systematic Botany," published in 1895. He, however, deserves great credit as being the first in this country to insist that bacteria may be actively pathogenic to plants and not merely passive associates of other organisms. This he stressed from 1900, when he published an account of the bacterial disease of turnip.

Late in life he took Holy Orders, and on his retirement went to live in Hampshire. He became a member of the B.N.S.S. in 1926 and was President for the year 1940-41. He died at his home at New Milton on March 9th, 1948.

Mr. A. S. HEMMY.

Arthur Stanley Hemmy, B.A., M.Sc., the son of a Victorian Civil Servant, was born in Melbourne, Australia, on June 18th, 1873, He was an outstanding pupil of Wesley College, whence he proceeded to Melbourne University, graduating there with such distinction that in 1894 he was elected to a Scholarship in Natural Science at St. John's College, Cambridge. His career at Cambridge was brilliant and he joined the team of physicists working

with Sir J. J. Thomson at the Cavendish Laboratory. In preference however, to accepting a College Fellowship, Mr. Hemmy left England in 1899 to take up an appointment as Professor of Physics and Chemistry at the University College of Lahore, India. In all he was 30 years at Lahore, having in due course received promotion to the dignity of Principal of the University. While there he was appointed scientific advisor to the Archæological Expedition of Sir John Marshall and Dr. E. J. W. Mackay, which between 1922 and 1927 was engaged on a study of the ancient civilisation of Mohinjo-Dara in the Indus Valley. He established himself as an authority on ancient standards of weight and measure, and his main interests in later life were definitely of an archæological and ethnological kind.

Upon his retirement Mr. Hemmy lived in Torquay and Bournemouth and joined our Society in 1932. He lent distinction to the Archæological Section, of which for many years, and at the time of his death, he was Chairman. He was elected President of the Society for the year 1944-45. He died on April 8th, 1948, in his 75th year.

Mr. F. L. LOWTHER.

Francis Llewellyn Lowther was born at Cardigan in 1870, the eighth child of Launcelot Lowther. He was educated at Cardiff University and obtained the Bachelor of Arts degree and the Intermediate Bachelor of Science of London University. His interests were wide, being both literary and scientific.

He was for six years senior master at Newport Intermediate School, and afterwards 28 years Headmaster of Milford Haven Grammar School. In 1930 he retired to Parkstone and almost immediately joined the B.N.S.S. He quickly established himself as a valuable and versatile member of the Society, becoming Entomological Secretary in 1937, Chairman of the Archæological Section from 1938 to 1942, and Chairman of the Geographical Section from 1943 till just before the time of his death.

He was a keen nature lover, his eldest brother having interested him in wild flowers at an early age. During the last few years of his life his special interest was in fungi.

He led many botanical rambles and archæological outings for the Society and enthused everyone by his general knowledge on these occasions.

He published two books, "A Geography of Wales" and "The Beauties of Pembrokeshire."

Extracts from "The Proceedings" Vol. 1 1909.

As our Society is now launching its first volume of Proceedings, an important epoch to all its supporters, this seems a fitting time to give a brief account of the previously existing local scientific society . . . . The older Society appears to have been formed on 24th of January, 1883, when a meeting was held in Bournemouth at which "it was decided to make the attempt to establish a Society for the promotion of Natural Science in the town of Bournemouth." There were present "the following gentlemen only—the night being wet—The Rev. Nehemiah Curnock, Messrs. Dolamore, W. Harding, Ballard, Axford, and Percy Bright." In February a provisional Committee was formed, and on February 21st, 1883, "An inauguration was held in a suite of rooms kindly lent by Mr. Bright, the Arcade, at which a great number of interesting objects were exhibited, with a number of microscopes and other scientific instruments. The rooms were crowded during the evening. Everyone present expressed themselves highly gratified with the result."

The first lecture was on "Microscopic Life in a Pond," by Rev. Nehemiah Curnock . . . . The first annual meeting was held on May 3rd, 1883. Mr. Bright offered the use of a room for the Society, rent free, for the first year. The subscription was fixed at 5s.; the members numbered 68, "but we shall not be satisfied until we have every scientific man and woman in Bournemouth on our roll". . . . On September 19th, 1883, it was decided that the meetings of the Society be held at 8 o'clock on Thursday evenings . . . .

* * * *

In 1884 there was a lecture on Gold and Silver, when the Kong Mountains are given as the only source of gold in Africa! This is a sign of the times, the present goldfields of South Africa being then practically unknown and undeveloped . . . .

For 10 years or so, from 1883, the Society seems to have advanced and prospered; after that occurred a gradual falling off, which is reflected in the reduction of the funds, and in the bald character of the annual reports . . . . On 4th November, 1897, at a general meeting, it was decided "that the Society be dissolved at the termination of the present quarter," when there was also a discussion as to the reconstruction of the Society.

At a final meeting on 9th December, 1897, the Library and Collections were vested in trustees, who were authorised to give the books and collections to any Natural Science Society that may be formed in Bournemouth before the end of 1898. However, it was finally directed that the books be presented at once to the

Public Library, and that the collections be offered to the Town Council, and failing acceptance, to the School of Art . . . . It is much to be regretted that the existing Society has not come into possession of the excellent collections and books formed by its predecessor.

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To complete the record we may here briefly refer to the origin and proceedings of our present Society. These remarks are based on information given in the annual reports, five of which have been issued, commencing with that for 1904 (1903-4).

From the first report we gather that "In November last, stimulated by the action of W. Saville-Kent, Esq., F.L.S., F.Z.S., an endeavour was made to resuscitate the Natural Science Society, hoping that under his influence and guidance the Society might be revived, and regain some of its pristine vigour and activity." Several preliminary meetings were held at Pen Selwood, the residence of Miss Rooper, with the result that officers were appointed and a set of rules adopted, the title of the Society being given as the Bournemouth and District Society of Natural Science. The chief officers were : President, J. E. Beale, Esq., Mayor of Bournemouth; Vice-Presidents, E. Hyla Greves, Esq., M.D., F.R.C.P., W. Saville-Kent, Esq., F.L.S., F.Z.S., F.R.M.S., Rev. E. Linton, M.A.; Chairman of Committee, J. Roberts Thomson, Esq., M.D., F.R.C.P.; Hon. Secretaries, Miss C. Agnes Rooper and Dr. J. R. L. Dixon, M.R.C.S., L.R.C.P.

The Committee reported : "The revival of the Society has been marked by phenomenal success. The membership became 112, and during the session 17 lectures were given" . . . .

The proceedings of the past five years are more or less fresh in the memory of the bulk of the present members. (Then follows a yearly table from which it is seen that the membership grew from 112 to 267, the funds in hand from nil to £20, while the meetings per session increased to 70) . . . .

The year 1909 has been marked by the acquisition of the present commodious rooms in Granville Chambers, Richmond Hill, which constitute a home of the Society such as it never seems to have possessed before.

If each member of the Society in his or her own sphere does his or her best to recruit new members as opportunity offers, and to contribute something original in the way of scientific papers, lectures, notes, or gifts of specimens, etc., we are confident that the Society has a long period of activity and usefulness before it.

PRESENTED